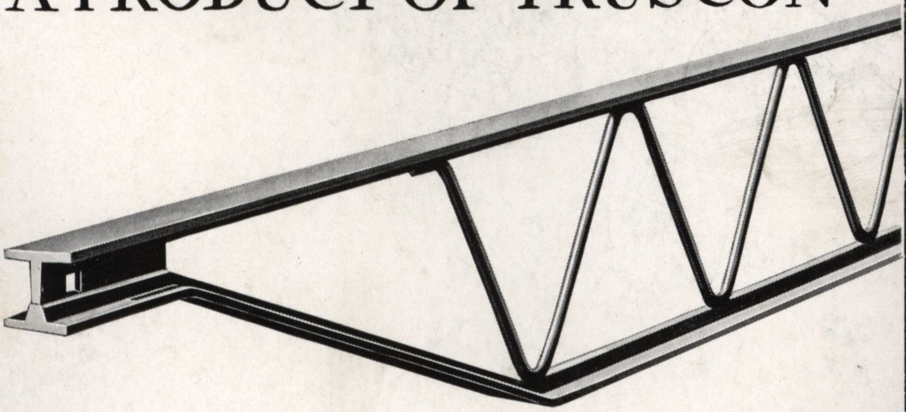
A. I. A. File Number 13g

"O-T" OPEN TRUSS

STEEL JOISTS

A PRODUCT OF TRUSCON



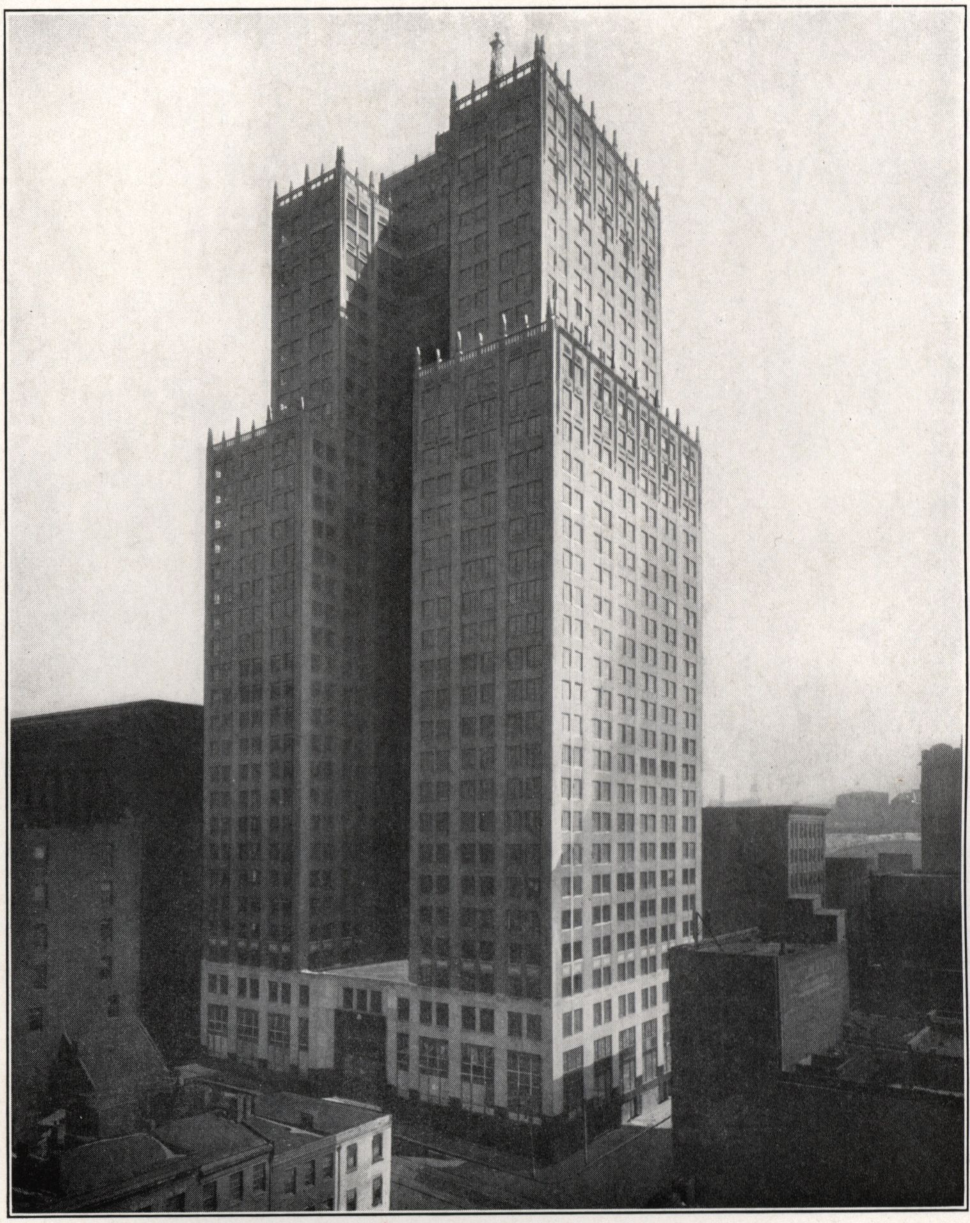
CATALOG No. 650

TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO

SALES AND ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

A. I. A. File Number 13g

A thirty-five story Office Building with Steel Joist Construction throughout



GRANT BUILDING, PITTSBURGH, PA.
Henry Hornbostel, Architect
Thompson-Starrett Co., Contractors
M. Neumann, Structural Engineer

"O-T" OPEN TRUSS

STEEL JOISTS

A PRODUCT OF TRUSCON

for Modern Fireproof
Building Construction

EDITION 1930
No. 650

TRUSCON STEEL COMPANY
YOUNGSTOWN, OHIO

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Printed in U. S. A.

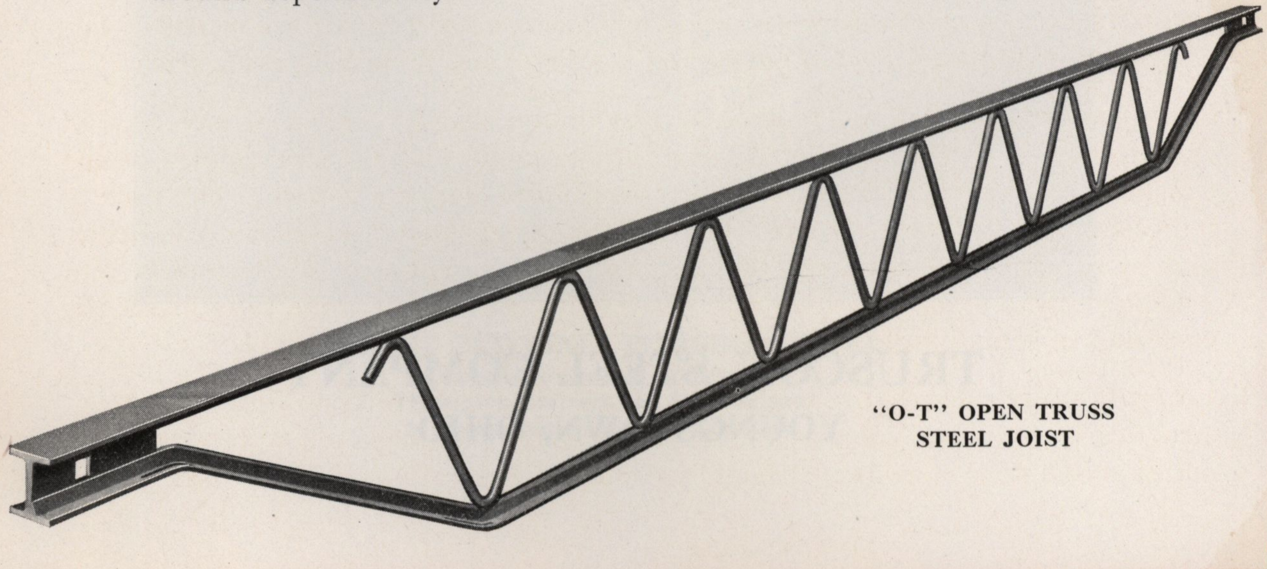
For Economical and Fireproof Floors

To MEET the demand for economical, light weight and fireproof floors, Truscon has developed the "O-T" Open Truss Steel Joist which is designed according to the best engineering practice and offers many advantageous and distinctive features. In effect, the entire design is unusually efficient as well as exceptionally economical of materials.

Fundamentally, the Truscon "O-T" Open Truss Steel Joist is a Warren truss having top and bottom chords of wide tee-shaped members to provide the greatest resistance to buckling strains. The bottom tee is continuous to the bearings, where it is welded with the web plate and top chord to form a solid I-beam. Web members are continuous from end to end so that stresses are transmitted perfectly. High pressure electric welding is used to make positive connections at all joints.

The underslung design of the bearing permits maximum headroom under the supporting girders. The open web allows the passage of pipes and conduits of any number and in any direction.

In practical use Truscon "O-T" Open Truss Steel Joists are very simple to install, being completely shop fabricated and reaching the job ready for placing. Each joist is marked to correspond with the erection diagram, thus greatly simplifying and speeding construction work. Only the highest quality open hearth steel is used. Thorough tests under extreme loadings have demonstrated their all-around dependability.



"O-T" OPEN TRUSS STEEL JOIST

Definite Advantages and Economies

Adaptability—Truscon "O-T" Open Truss Steel Joists are adaptable to all types of buildings, regardless of their location, and in small buildings at practically the same cost per square foot as in skyscrapers. Fireproof construction is thus made available in many buildings where other systems of fireproof construction would not be practical.

Economy—The economy of this construction occurs not only in the construction itself but in the savings that its light weight effects throughout the building in the supporting framework and foundations. Its speedy erection protects the original investment and minimizes the overhead expense. In the completed building, the permanence of Truscon "O-T" Open Truss Steel Joist Construction lowers insurance costs and maintenance expense.

Speed of Erection—The erection of Truscon "O-T" Open Truss Steel Joists is very rapid, because all units are shop-fabricated and reach the job ready for placing with a minimum amount of field labor. Being self-sustaining, any number of floors can be constructed at one time. No centering or false work is required. No special equipment is needed.

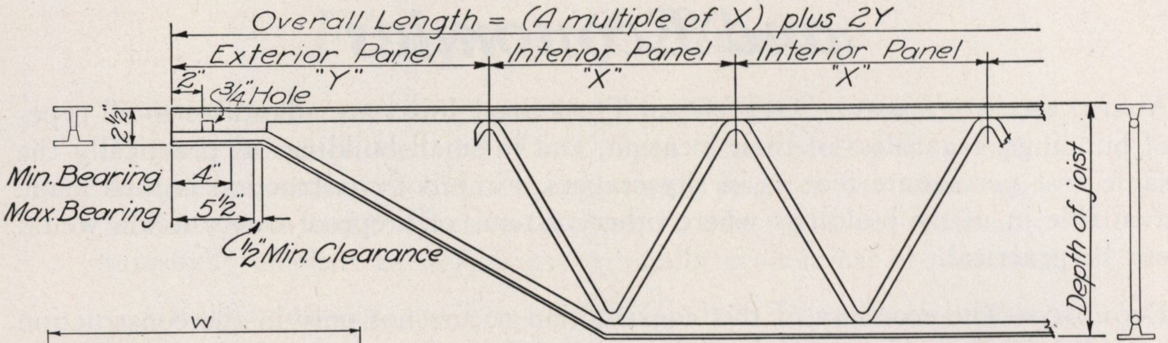
All Weather Building—Construction is carried on as readily in winter as in summer. Unlike many other systems of fireproof construction, Truscon "O-T" Open Truss Steel Joist Construction is not dependent upon the setting of cement, which is seriously retarded by cold weather.

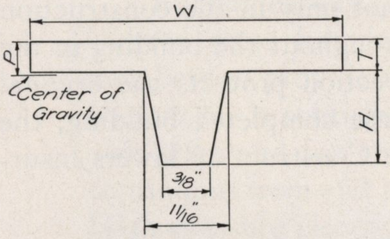
Fireproofness—Fire tests prove that ⅞″ of cement or gypsum ceiling plaster protects Truscon "O-T" Open Truss Steel Joist Construction against high temperatures. The majority of insurance rating bureaus have recognized the merits of this construction and have accordingly given it a first class fireproof classification.

Soundproofness—The only practical test of the soundproofness of any type of construction is in the completed construction itself. The extreme rigidity of the construction prevents the vibration of the entire floor as a body. The greatly increased use of Truscon "O-T" Open Truss Steel Joist Construction in larger and more expensive types of buildings, and its acceptance by Architects and Engineers in all parts of the country proves that this construction fully meets the essentials of soundproofness in any kind of building.

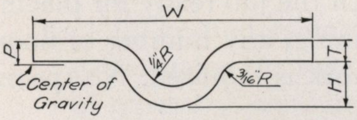
Light Weight—The light weight of Truscon "O-T" Open Truss Steel Joist Construction is of utmost value in adding stories to old buildings, often permitting the addition of a floor more than originally contemplated.

Dimensions and Properties





Sections 423 to 427 inclusive



Sections 421 and 422

PROPERTIES OF CHORD SECTIONS

Section Number	W	T	H	P	Area	I	r
421	2¼″	5/32″	11/32″	.175″	.391	.0066	.130
422	2¼″	13/64″	19/64″	.180″	.492	.009	.138
423	2¼″	9/64″	½″	.205″	.582	.018	.178
424	2¼″	13/64″	½″	.222″	.723	.025	.186
425	2½″	¼″	½″	.227″	.876	.031	.187
426	2½″	¼″	¾″	.305″	1.023	.074	.268
427	2¾″	5/16″	¾″	.313″	1.257	.092	.270

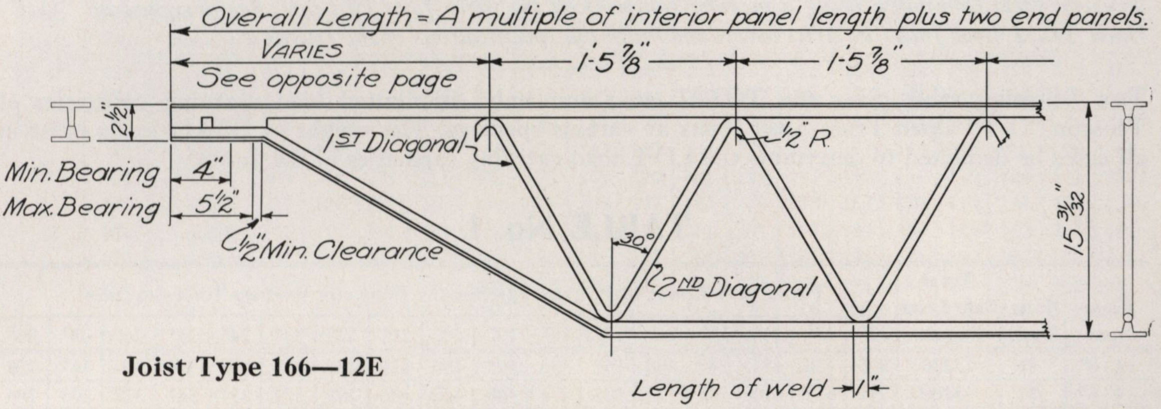
JOIST DIMENSIONS AND PROPERTIES

Joist Type	Joist Depth	Top Chord Section	Bottom Chord Section	Web	"X"	Exterior panel lengths are made in the following **variable "Y"** dimensions, and with these suffix letters.					
						A	B	C	D	E	F
81	8″	421	421	⅜″	9″	1′- 2½″	1′- 4″	1′- 5½″			
82	8″	422	421	7/16″	9″	1′- 2½″	1′- 4″	1′- 5½″			
102	10″	422	421	7/16″	11⅛″	1′- 4⅝″	1′- 6⅛″	1′- 7⅝″	**1′- 9⅛″**		
103	10″	423	422	7/16″	11⅛″	1′- 4⅝″	1′- 6⅛″	1′- 7⅝″	**1′- 9⅛″**		
104	10″	424	423	½″	11¼″	1′- 4¾″	1′- 6¼″	1′- 7¾″	1′- 9¼″		
123	12″	423	422	½″	13⅝″	1′- 7⅛″	1′- 8⅝″	1′-10⅛″	1′-11⅝″	**2′-1⅛″**	
124	12″	424	423	½″	13⅝″	1′- 7⅛″	1′- 8⅝″	1′-10⅛″	1′-11⅝″	**2′-1⅛″**	
125	12″	425	424	½″	13⅝″	1′- 7⅛″	1′- 8⅝″	1′-10⅛″	1′-11⅝″	2′-1⅛″	
126	12″	426	425	9/16″	13⅜″	1′- 6⅞″	1′- 8⅜″	1′- 9⅞″	1′-11⅜″	2′-0⅞″	
145	14″	425	424	9/16″	15¾″	1′- 9¼″	1′-10¾″	2′- 0¼″	2′- 1¾″	2′-3¼″	2′-4¾″
146	14″	426	425	9/16″	15¾″	1′- 9¼″	1′-10¾″	2′- 0¼″	2′- 1¾″	2′-3¼″	2′-4¾″
147	14″	427	426	⅝″	15¼″	1′- 8¾″	1′-10¼″	1′-11¾″	2′- 1¼″	2′-2¾″	
166	16″	426	425	⅝″	17⅞″	1′-11⅜″	2′- 0⅞″	2′- 2⅜″	2′- 3⅞″	2′-5⅜″	2′-6⅞″
167	16″	427	426	⅝″	17⅞″	1′-11⅜″	2′- 0⅞″	2′- 2⅜″	2′- 3⅞″	2′-5⅜″	2′-6⅞″

NOMENCLATURE: The complete nomenclature of a joist is determined by combining the "Joist Type," number of interior "X" panels, and the proper suffix letter to indicate the exterior panel "Y" length.

EXAMPLE: 125-08C represents a joist type 125 with 8 interior panels and exterior panels of "C" length making an overall dimension of 12′-9¼″.

Typical Calculations



Joist Type 166—12E

Truscon Steel Company, being a member company of the Steel Joist Institute, has designed all "O-T" Open Truss Steel Joists in accordance with the specifications of the Institute.

Calculation of Allowable Stress in Top Chord:

Unsupported length = panel centers minus length of weld = 17⅞"—1" = 16⅞".

$$\text{Allowable stress} = fs = \frac{18000}{1 + \frac{l^2}{18000\ r^2}} = \frac{18000}{1 + \frac{16.875^2}{18000 \text{x} .268^2}} = 14751\ \#/\square''$$

Calculation of Resisting Moments of Chord Members:

Top Chord = 426 Section; Bottom Chord = 425 Section; Effective depth = distance between centers of gravity of top and bottom chords = $15\frac{31}{32}''$—.305"—.227" = 15.424".
R. M. of Top Chord = 1.023□" x 14751 x 15.424" = 232,750 inch lbs.
R. M. of Bottom Chord = .876□" x 18000 x 15.424" = 243,000 inch lbs.
R. M. required by Steel Joist Institute = 225,000 inch lbs.
The resisting moment of the top chord governs because it is less than the R. M. of the bottom chord.

Calculation of Safe Loads:

$$M = \frac{W\,l}{8};\ W = \frac{8M}{L \text{x} 12} = \frac{8 \text{x} 232,750}{L \text{x} 12}$$

This value of W must not exceed twice the Max. End Reaction as calculated below.

Calculation of Allowable Stress in Web:

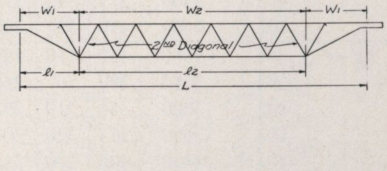
Web = ⅝" round; Unsupported length = $16\frac{1}{16}''$.

$$\text{Allowable stress} = fs = \frac{18000}{1 + \frac{16.0625^2}{18000 \text{ x } .156^2}} = 11,340\#/\square''$$

To Determine Maximum End Reaction:

Beginning at the center of the joist and considering the load sustained by each compression web member, we find that the 2nd diagonal from each end sustains all load from its base to the center of the joist and the remaining portion of the floor load is sustained by the end portion of the joist.

Therefore load W_2 equals twice the shear value of the 2nd diagonal. This load W_2 divided by the distance l_2 gives the carrying capacity of the joist per lineal foot and, when multipied by the clear span L, gives the total carrying capacity of the joist which is twice the end reaction.



Calculation of 2nd Diagonal Shear Value:

V = fs x area x cos 30° = 11340 x .3068 x .866 = 3013#.

Calculation of Maximum End Reaction:

Assuming a clear span of 22'-0" and a joist type 166, the complete nomenclature of the required joist would be 166-12E (22'-9¼" overall). The distance l_2 would be 11 x 1'-5⅞" or 16'-4⅝".

$$\frac{2 \text{ x } 3013 \text{ x } 22}{16'\text{-}4\tfrac{5}{8}''} = 8090\# \text{ or Max. End Reaction of } 4045\#.$$

Steel Joist Institute required end reaction = 3200#.

Preparation of Safe Load Tables:

From "Calculation of Safe Load," we obtain the value $W = \frac{8 \text{ x } 232,750}{L \text{ x } 12}$ but not to exceed 8090#.

$$\frac{8 \text{ x } 232,750}{22 \text{ x } 12} = 7053\# \text{ safe load by resisting moment.}$$

From the above calculations it is clearly evident that the Truscon "O-T" Open Truss Steel Joist exceeds the requirements of the Steel Joist Institute in every respect.

Steel Joist Loading Table

Truscon Steel Company, being a member company of the Steel Joist Institute, has designed all "O-T" Open Truss Steel Joists in strict accordance with the specifications of the Institute.

THE following table gives the TOTAL safe uniformly distributed load carrying capacities of Truscon "O-T" Open Truss Steel Joists at various spacings. The weight of DEAD loads must in all cases be deducted to determine the LIVE load carrying capacities of the Joists.

TABLE No. 1

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
4′-0″	81	3200	800	738	685	640	600	565	533	505	480	456	436	417	400	384	369	343	320
4′-6″	81	3200	711	657	610	568	533	503	474	449	427	406	388	371	355	341	328	305	284
5′-0″	81	3200	640	590	549	512	480	453	427	404	384	366	349	334	320	307	295	274	256
5′-6″	81	3200	582	537	498	465	436	411	488	367	349	332	317	303	291	279	268	249	233
6′-0″	81	3200	530	492	457	426	400	376	356	337	320	305	291	278	267	256	246	229	213
6′-6″	81	3020	464	428	398	371	348	328	310	293	278	265	253	242	232	223	214	199	186
7′-0″	81	2810	402	370	344	321	301	283	268	254	241	229	219	209	202	193	185	172	160
7′-6″	81	2620	349	322	299	279	262	246	233	220	209	199	190	182	174	167	161	150	140
8′-0″	81	2460	308	284	264	246	231	217	205	194	184	176	168	160	154	148	142	132	123
	82	3800	475	438	407	380	356	335	316	300	285	271	259	248	238	228	219	204	190
8′-6″	81	2310	272	251	233	218	204	192	181	172	163	155	148	142	136	131	125	116	109
	82	3800	447	413	383	358	336	316	298	282	268	255	244	233	223	215	206	192	179
9′-0″	81	2180	243	224	208	194	182	171	162	153	145	138	132	127	121	116	112	104	97
	82	3800	422	390	362	338	316	298	282	266	254	242	230	220	211	203	195	181	169
9′-6″	81	2070	218	201	187	174	163	154	145	138	131	124	119	113	109	105	101	93	87
	82	3690	388	358	332	310	291	274	259	245	233	222	212	202	194	186	179	166	155
10′-0″	81	1970	197	182	169	158	148	139	131	125	118	113	108	103	99	95	91	85	79
	82	3500	350	323	300	280	263	247	233	221	210	200	191	183	175	168	162	150	140
	102	3800	380	351	326	304	285	268	253	240	228	217	207	198	190	182	175	163	152
	103	3900	390	360	334	312	292	275	260	246	234	223	213	203	195	187	180	167	156
	104	4400	440	406	377	352	330	312	293	278	264	252	240	230	220	211	203	189	176
10′-6″	81	1860	177	164	152	142	133	125	118	112	106	101	96	92	88	85	82	76	71
	82	3335	317	293	272	254	238	224	212	201	190	181	173	165	158	152	146	136	127
	102	3800	362	334	310	290	271	255	241	228	217	207	197	189	181	174	167	155	145
	103	3900	371	342	318	297	278	263	248	234	223	212	203	194	186	178	171	159	149
	104	4400	419	387	359	335	314	296	280	265	252	240	229	219	210	201	193	180	168
11′-0″	81	1780	162	150	139	130	121	114	108	102	97	92	89	85	81	78	75	70	65
	82	3180	289	267	248	232	217	205	193	183	174	165	158	151	145	139	134	124	116
	102	3800	346	319	297	277	259	244	230	218	208	197	189	180	173	166	160	148	138
	103	3900	355	328	304	284	266	250	236	224	213	202	194	185	178	170	164	152	142
	104	4400	400	370	343	320	300	283	267	253	240	228	218	208	200	192	185	172	160
11′-6″	81	1700	148	136	127	118	111	104	99	93	89	84	80	77	74	71	68	63	59
	82	3040	264	244	227	212	198	187	176	167	159	151	144	138	132	127	122	113	106
	102	3650	317	293	272	254	238	224	211	201	191	181	173	165	159	152	147	136	127
	103	3900	339	313	291	271	254	239	226	214	203	194	185	177	170	163	157	145	136
	104	4400	383	353	328	306	287	270	255	242	230	219	209	200	192	184	177	164	153
12′-0″	81	1635	137	126	117	109	102	96	91	86	82	78	74	71	68	65	63	58	55
	82	2920	243	224	208	195	183	172	162	154	146	139	133	127	122	117	112	104	98
	102	3500	292	269	250	233	219	206	194	184	175	167	159	152	146	140	135	125	117
	103	3900	325	300	279	260	244	230	217	205	195	186	177	170	163	156	150	139	130
	104	4400	367	339	314	294	275	259	244	232	220	210	200	191	183	176	169	157	147
	123	4400	367	339	314	294	275	259	244	232	220	210	200	191	183	176	169	157	147
	124	4600	384	354	329	307	288	271	256	242	230	219	209	200	192	184	177	164	153

TABLE No. 1 (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
12′–0″	125	5000	417	385	358	333	312	294	278	263	250	238	228	218	208	200	192	179	167
	126	5400	450	415	386	360	338	318	300	284	270	257	246	235	225	216	208	193	180
12′–6″	81	1570	126	116	108	100	94	89	84	79	75	72	68	65	63	60	58	54	50
	82	2800	224	208	192	179	168	158	149	142	134	128	122	117	112	108	103	96	90
	102	3360	269	248	231	215	202	190	179	170	161	154	147	140	134	129	124	115	108
	103	3900	312	288	268	250	234	220	208	197	187	178	170	163	156	150	144	134	125
	104	4400	352	325	302	282	264	248	235	222	211	201	192	184	176	169	162	151	141
	123	4400	352	325	302	282	264	248	235	222	211	201	192	184	176	169	162	151	141
	124	4600	368	340	316	295	276	260	246	233	221	210	201	192	184	177	170	158	147
	125	5000	400	369	343	320	300	283	267	253	240	229	218	209	200	192	185	172	160
	126	5400	432	398	370	345	324	305	288	273	259	247	236	226	216	207	199	185	173
13′–0″	81	1510	116	107	100	93	87	82	78	73	70	66	63	61	58	56	54	50	46
	82	2690	207	191	177	165	155	146	138	131	124	118	113	108	103	100	96	89	83
	102	3230	248	230	213	199	187	176	166	157	149	142	136	130	124	119	115	107	99
	103	3900	300	277	257	240	225	212	200	190	180	172	164	157	150	144	138	129	120
	104	4400	338	312	290	270	254	239	225	214	203	193	184	177	169	162	156	145	135
	123	4400	338	312	290	270	254	239	225	214	203	193	184	177	169	162	156	145	135
	124	4600	354	327	303	283	265	250	236	224	212	202	193	185	177	170	163	152	142
	125	5000	384	355	330	308	288	272	256	243	231	220	210	201	192	184	177	165	154
	126	5400	415	384	356	332	312	293	277	262	249	237	226	217	208	199	192	177	166
13′–6″	81	1450	107	99	92	86	81	76	72	68	64	61	59	56	54	52	50	46	43
	82	2590	192	177	164	154	144	135	128	121	115	110	105	100	96	92	89	82	77
	102	3110	230	213	197	184	173	163	154	146	138	132	126	120	115	111	106	99	92
	103	3900	289	267	248	232	217	204	193	183	173	165	158	151	145	139	133	124	116
	104	4400	326	301	280	261	244	230	217	206	196	186	178	170	163	156	150	140	130
	123	4400	326	301	280	261	244	230	217	206	196	186	178	170	163	156	150	140	130
	124	4600	341	315	292	273	256	241	227	216	204	195	186	178	170	164	157	146	136
	125	5000	371	342	318	296	278	262	247	234	222	212	202	194	186	178	171	159	148
	126	5400	400	370	343	320	300	282	267	252	240	229	218	209	200	192	185	171	160
14′–0″	81	1400	100	92	86	80	75	71	67	63	60	57	55	52	50	48	46	43	40
	82	2500	178	165	153	143	134	126	119	113	107	102	98	93	89	86	82	77	71
	102	3000	214	198	184	172	161	152	143	135	129	123	117	112	107	103	99	92	86
	103	3900	278	257	239	223	209	197	186	176	167	159	152	145	139	134	129	119	111
	104	4400	314	290	270	252	236	222	210	199	189	180	172	164	157	151	145	135	126
	123	4380	313	289	268	250	235	221	209	198	188	179	171	163	156	150	144	134	125
	124	4600	328	303	282	263	246	232	219	208	197	188	179	171	164	157	152	141	131
	125	5000	357	330	306	286	268	252	238	226	214	204	195	187	179	172	165	153	143
	126	5400	386	356	331	309	289	272	257	244	232	220	210	201	193	185	178	165	154
	145	5800	414	383	355	332	311	292	276	262	248	237	226	216	207	199	191	178	166
	146	6200	443	409	380	354	332	313	296	280	266	253	242	231	222	213	204	190	177
	147	6800	486	449	416	389	364	343	324	307	292	278	265	254	243	233	224	208	194
14′–6″	81	1350	93	86	80	75	70	66	62	59	56	53	51	49	47	45	43	40	37
	82	2420	167	154	143	134	125	118	111	105	100	96	91	87	84	80	77	72	67
	102	2900	200	185	171	160	150	141	133	126	120	114	109	104	100	96	92	86	80
	103	3790	261	241	224	209	196	185	174	165	157	149	142	136	131	125	121	112	104
	104	4400	304	280	260	243	228	214	202	192	182	173	166	158	152	146	140	130	121
	123	4230	292	270	250	234	219	206	195	184	175	167	159	152	146	140	135	125	117
	124	4600	317	293	272	254	238	224	212	200	190	181	173	166	159	152	147	136	127
	125	5000	345	318	296	276	259	244	230	218	207	197	188	180	172	165	159	148	138
	126	5400	372	344	319	298	279	263	248	235	224	213	203	194	186	179	172	160	149
	145	5800	400	369	343	320	300	282	267	253	240	228	218	209	200	192	185	171	160
	146	6200	428	395	367	342	321	302	285	270	257	244	233	223	214	205	198	183	171
	147	6800	469	433	402	375	352	331	313	296	282	268	256	244	234	225	216	201	188

TABLE No. 1 (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
15′–0″	81	1310	87	81	75	70	66	62	58	55	52	50	48	46	44	42	40	37	35
	82	2330	155	143	133	124	116	110	104	98	93	89	85	81	78	75	72	67	62
	102	2810	187	173	161	150	141	132	125	118	112	107	102	98	94	90	87	80	75
	103	3640	243	224	208	194	182	172	162	153	146	139	133	127	122	117	112	104	97
	104	4400	293	271	252	235	220	207	196	185	176	168	160	153	147	141	135	126	117
	123	4090	272	252	234	218	204	192	182	172	163	156	148	142	136	131	126	117	109
	124	4600	307	284	263	246	230	217	204	194	184	175	167	160	153	147	142	132	123
	125	5000	333	308	286	267	250	235	222	210	200	191	182	174	167	160	154	143	133
	126	5400	360	332	308	288	270	254	240	227	216	206	196	188	180	173	166	154	144
	145	5800	387	357	332	310	290	273	258	244	232	221	211	202	193	186	179	166	155
	146	6200	413	381	354	330	310	292	276	261	248	236	225	216	207	198	191	177	165
	147	6800	454	419	389	363	340	320	302	286	272	259	248	237	227	218	209	194	181
15′–6″	81	1270	82	76	70	66	62	58	55	52	49	47	45	43	41	39	38	35	33
	82	2260	146	135	125	117	109	103	97	92	88	83	80	76	73	70	67	63	58
	102	2710	175	162	150	140	131	124	117	111	105	100	96	91	88	84	81	75	70
	103	3530	228	210	195	182	171	161	152	144	137	130	124	119	114	109	105	98	91
	104	4300	278	256	238	222	208	196	185	175	167	159	152	145	139	133	128	119	111
	123	3960	256	236	219	204	192	180	170	161	153	146	139	133	128	123	118	109	102
	124	4600	297	274	254	237	223	210	198	188	178	170	162	155	148	142	137	127	119
	125	5000	323	298	276	258	242	228	215	204	193	185	176	168	161	155	149	138	129
	126	5400	349	322	299	279	262	246	233	220	210	199	190	182	174	167	161	149	139
	145	5800	374	346	321	300	281	264	250	236	224	214	204	195	187	180	173	160	150
	146	6200	400	369	343	320	300	282	267	253	240	228	218	209	200	192	184	171	160
	147	6800	439	405	376	351	329	310	292	277	263	250	239	229	219	210	202	188	175
16′–0″	81	1230	77	71	66	62	58	54	51	49	46	44	42	40	38	37	35	33	31
	82	2190	137	126	117	109	103	97	91	86	82	78	75	71	68	66	63	59	55
	102	2630	164	152	141	132	123	116	110	104	99	94	90	86	82	79	76	70	66
	103	3420	213	197	182	170	160	150	142	134	128	122	116	111	106	102	98	91	85
	104	4170	260	240	223	208	195	184	173	164	156	149	142	136	130	125	120	112	104
	123	3840	240	222	206	192	180	170	160	152	144	137	131	125	120	115	111	103	96
	124	4600	287	265	246	230	216	203	192	182	172	164	157	150	144	138	133	123	115
	125	5000	312	288	268	250	234	221	208	197	187	178	170	163	156	150	144	134	125
	126	5400	337	312	289	270	253	238	225	213	202	193	184	176	169	162	156	145	135
	145	5800	363	335	311	290	272	256	242	229	218	208	198	189	182	174	167	156	145
	146	6200	387	358	332	310	290	274	258	245	233	222	212	202	194	186	179	166	155
	147	6800	425	392	364	340	319	300	283	268	255	243	232	222	213	204	196	182	170
	166	6400	400	369	343	320	300	282	266	253	240	228	218	208	200	192	185	171	160
	167	7200	450	416	386	360	338	318	300	284	270	257	246	235	225	216	208	193	180
16′–6″	102	2540	154	142	132	123	116	109	103	97	93	88	84	81	77	74	71	66	62
	103	3310	201	185	172	161	151	142	134	127	120	115	109	105	100	96	93	86	80
	104	4040	245	226	210	196	184	173	164	155	147	140	134	128	123	118	113	105	98
	123	3720	226	208	193	180	169	159	150	143	135	129	123	118	113	108	104	97	90
	124	4600	279	257	239	223	209	197	186	176	167	159	152	146	140	134	129	120	111
	125	5000	303	280	260	242	227	214	202	192	182	174	166	158	152	146	140	130	121
	126	5400	328	302	280	262	246	231	218	207	197	187	179	171	164	157	151	140	131
	145	5800	352	325	302	281	264	248	235	222	211	201	192	184	176	169	163	151	141
	146	6200	376	347	322	301	282	265	250	237	226	215	205	196	188	180	174	161	150
	147	6800	412	380	353	330	309	291	275	260	247	236	225	215	206	198	190	177	165
	166	6400	388	358	332	310	291	274	259	245	233	222	212	202	194	186	179	166	155
	167	7200	437	403	374	349	328	308	291	276	262	249	238	228	218	210	201	187	175
17′–0″	102	2470	145	134	125	116	109	103	97	92	87	83	79	76	73	70	67	62	58
	103	3220	189	175	162	152	142	134	126	120	114	108	103	99	95	91	87	81	76
	104	3920	230	212	197	184	173	162	153	145	138	132	126	120	115	110	106	99	92
	123	3610	212	196	182	170	159	150	142	134	127	121	116	111	106	102	98	91	85

TABLE No. 1 (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
17′–0″	124	4510	265	245	227	212	199	187	177	168	159	152	145	139	133	127	122	114	106
	125	5000	294	272	252	235	220	208	196	186	177	168	161	154	147	141	136	126	118
	126	5400	318	293	272	254	238	224	212	201	191	182	173	166	159	153	147	136	127
	145	5800	342	315	292	273	256	241	228	215	205	195	186	178	171	164	158	146	137
	146	6200	365	337	313	292	273	258	243	230	219	209	199	191	183	175	169	157	146
	147	6800	400	370	343	320	300	282	267	253	240	229	219	209	200	192	185	172	160
	166	6400	376	348	323	301	282	266	251	238	226	215	205	197	188	181	174	162	151
	167	7200	424	392	363	339	318	299	283	268	255	242	231	221	212	203	196	182	170
17′–6″	102	2400	137	127	118	110	103	97	92	87	82	78	75	72	69	66	63	59	55
	103	3120	178	165	153	143	134	126	119	113	107	102	97	93	89	86	82	76	71
	104	3810	218	201	187	174	163	154	145	138	131	125	119	114	109	105	100	93	87
	123	3500	200	185	172	160	150	141	133	126	120	114	109	104	100	96	92	86	80
	124	4380	250	231	214	200	188	177	167	158	150	143	137	131	125	120	115	107	100
	125	5000	286	264	245	229	215	202	191	181	172	163	156	149	143	137	132	122	114
	126	5400	309	285	265	247	232	218	206	195	185	177	169	161	154	148	143	133	124
	145	5800	331	306	284	265	249	234	221	209	199	190	181	173	166	159	153	142	133
	146	6200	354	327	304	284	266	250	236	224	213	203	194	185	177	170	164	152	142
	147	6800	389	359	333	311	292	274	259	245	233	222	212	203	195	187	180	167	156
	166	6400	366	338	314	293	275	258	244	231	220	209	200	191	183	176	169	157	147
	167	7200	411	380	353	329	308	290	274	260	247	235	225	215	206	197	190	176	165
18′–0″	102	2330	129	120	111	104	97	92	86	82	78	74	71	68	65	62	60	56	52
	103	3040	169	156	145	135	127	119	113	107	101	97	92	88	85	81	78	73	68
	104	3710	205	190	177	165	155	146	138	130	124	118	113	108	103	99	95	88	83
	123	3410	189	175	163	152	142	134	126	120	114	108	103	99	95	91	88	81	76
	124	4260	236	218	203	190	178	167	158	150	142	135	129	124	119	114	109	101	95
	125	5000	278	256	238	222	208	196	185	175	167	159	152	145	139	133	128	119	111
	126	5400	300	277	257	240	225	212	200	190	180	172	164	157	150	144	139	129	120
	145	5780	321	296	275	257	240	227	214	203	193	184	175	168	161	154	148	138	129
	146	6200	344	318	295	276	259	243	230	218	207	197	188	180	172	165	159	148	138
	147	6800	378	349	324	302	284	267	252	239	227	216	206	197	189	182	175	162	151
	166	6400	356	328	305	285	267	251	237	225	213	203	194	186	178	171	164	153	143
	167	7200	400	369	343	320	300	282	267	253	240	229	219	209	200	192	185	172	160
18′–6″	102	2270	123	113	105	98	92	87	82	78	74	70	67	64	61	59	57	53	49
	103	2960	160	148	137	128	120	113	107	101	96	92	88	84	80	77	74	69	64
	104	3600	195	180	167	156	146	138	130	123	117	111	106	102	98	94	90	84	78
	123	3320	180	166	154	144	135	127	120	113	108	103	98	94	90	86	83	77	72
	124	4150	225	207	193	180	169	159	150	142	135	128	122	117	112	108	104	96	90
	125	5000	270	250	232	217	203	191	181	171	162	155	148	141	135	130	125	116	108
	126	5400	292	270	250	234	219	206	195	185	175	167	159	152	146	140	135	125	117
	145	5630	305	281	261	244	229	215	203	193	183	174	166	159	153	147	141	131	122
	146	6200	335	309	287	268	251	236	224	212	201	192	183	175	168	161	155	144	134
	147	6800	367	339	315	294	276	259	245	232	221	210	201	192	184	176	170	158	147
	166	6400	346	320	297	277	260	245	231	219	208	198	189	181	173	166	160	148	138
	167	7200	389	359	334	312	292	275	260	246	234	223	212	203	195	187	180	167	156
19′–0″	102	2210	116	107	100	93	87	82	78	74	70	66	63	61	58	56	54	50	47
	103	2880	151	140	130	121	114	107	101	96	91	87	83	79	76	73	70	65	61
	104	3510	184	171	159	148	139	131	123	117	111	106	101	97	93	89	85	79	74
	123	3230	170	157	146	136	128	120	113	107	102	97	93	89	85	82	79	73	68
	124	4040	212	197	183	170	160	150	142	135	128	122	116	111	106	102	98	91	85
	125	4990	263	243	225	210	197	186	175	166	158	150	143	137	132	126	121	113	105
	126	5400	284	263	244	228	214	201	190	180	171	162	155	148	142	137	131	122	114
	145	5480	288	266	247	231	217	204	193	183	173	165	158	151	145	139	134	124	115
	146	6200	326	301	280	261	245	230	218	206	196	187	178	170	163	157	151	140	131
	147	6800	358	330	307	286	269	253	239	226	215	205	195	187	179	172	165	154	143

TABLE No. 1 (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
19′-0″	166	6400	337	311	289	270	253	238	225	213	202	193	184	176	168	162	156	145	135
	167	7200	379	350	325	303	284	268	253	239	227	217	207	198	190	182	175	163	152
19′-6″	102	2150	110	102	95	88	83	78	74	70	66	63	60	58	55	53	51	47	44
	103	2810	144	133	124	115	108	102	96	91	87	83	79	75	72	69	67	62	58
	104	3420	176	162	151	141	132	124	117	111	105	100	96	92	88	84	81	75	70
	123	3140	161	149	138	129	121	114	107	102	97	92	88	84	80	77	74	69	64
	124	3930	202	186	173	161	151	142	134	127	121	115	110	105	101	97	93	86	81
	125	4850	249	230	213	199	187	176	166	157	149	142	136	130	124	119	115	107	99
	126	5400	277	256	238	222	208	196	185	175	167	158	151	145	139	133	128	119	111
	145	5340	274	253	235	219	206	194	183	173	165	157	150	143	137	132	126	117	109
	146	6200	318	293	273	255	239	225	212	201	191	182	174	166	159	153	147	136	127
	147	6800	349	322	299	280	262	246	233	220	210	200	191	182	175	168	161	150	140
	166	6400	328	303	282	263	247	232	219	208	197	188	179	172	164	158	152	141	131
	167	7200	369	341	317	295	277	261	246	234	222	211	202	193	185	178	171	159	148
20′-0″	102	2100	105	97	90	84	79	74	70	66	63	60	57	55	53	51	49	45	42
	103	2730	137	126	117	109	102	96	91	86	82	78	75	71	68	66	63	59	55
	104	3340	167	154	143	134	125	118	111	105	100	95	91	87	84	80	77	72	67
	123	3060	153	141	131	123	115	108	102	97	92	88	84	80	77	74	71	66	61
	124	3830	192	177	164	153	144	135	128	121	115	109	104	100	96	92	89	82	77
	125	4740	237	219	203	190	178	168	158	150	142	135	129	124	119	114	109	102	95
	126	5400	270	249	232	216	203	191	180	171	162	154	148	141	135	130	125	116	108
	145	5200	260	240	223	208	195	184	174	164	156	149	142	136	130	125	120	112	104
	146	6200	310	286	266	248	232	219	207	196	186	177	169	162	155	149	143	133	124
	147	6800	340	314	292	272	255	240	227	215	204	195	186	178	170	163	157	146	136
	166	6400	320	295	275	256	240	226	213	202	192	183	175	167	160	154	148	137	128
	167	7200	360	332	309	288	270	254	240	228	216	206	197	188	180	173	166	155	144
20′-6″	123	2990	146	135	125	117	110	103	97	92	88	83	80	76	73	70	67	63	58
	124	3740	182	168	156	146	137	129	122	115	109	104	99	95	91	88	84	78	73
	125	4620	225	208	193	180	169	159	150	142	135	129	123	117	112	108	104	97	90
	126	5400	264	243	226	211	198	186	176	167	158	151	144	138	132	127	122	113	106
	145	5070	247	228	212	198	186	175	165	156	148	141	135	129	124	119	114	106	99
	146	6200	302	279	259	242	227	213	201	191	182	173	165	158	151	145	140	130	121
	147	6800	332	306	284	265	249	234	221	210	199	190	181	173	166	159	153	142	133
	166	6400	312	288	268	250	234	220	208	197	187	178	170	163	156	150	144	134	125
	167	7200	351	324	301	281	263	248	234	222	211	201	192	183	176	169	162	151	140
21′-0″	123	2920	139	128	119	111	104	98	93	88	83	79	76	73	70	67	64	60	56
	124	3650	174	161	149	139	130	123	116	110	104	99	95	91	87	83	80	75	70
	125	4510	215	198	184	172	161	152	143	136	129	123	117	112	107	103	99	92	86
	126	5400	257	237	220	206	193	182	172	162	154	147	140	134	129	124	119	110	103
	145	4950	236	217	202	189	177	166	157	149	142	135	129	123	118	113	109	101	94
	146	6200	295	273	253	236	222	209	197	187	177	169	161	154	148	142	136	127	118
	147	6800	324	298	277	259	243	229	216	205	194	185	177	169	162	155	149	139	129
	166	6400	305	281	261	244	229	215	203	193	183	174	166	159	153	147	141	131	122
	167	7200	343	316	294	274	257	242	229	217	206	196	187	179	172	165	158	147	137
21′-6″	123	2850	133	122	114	106	100	94	88	84	80	76	72	69	66	64	61	57	53
	124	3560	165	153	142	132	124	117	110	104	99	95	90	86	83	80	76	71	66
	125	4400	204	189	175	164	153	144	136	129	123	117	112	107	102	98	95	88	82
	126	5400	251	232	215	201	188	177	167	158	150	143	137	131	125	120	116	107	100
	145	4840	225	208	193	180	169	159	150	142	135	129	123	117	113	108	104	97	90
	146	6200	288	266	247	230	216	203	192	182	173	165	157	150	144	138	133	123	115
	147	6800	316	292	271	253	237	223	211	200	190	181	172	165	158	152	146	135	126
	166	6400	298	275	255	238	223	210	199	188	178	170	162	155	149	143	137	128	119
	167	7200	335	309	287	268	251	236	223	211	201	191	183	175	167	161	154	143	134

TABLE No. 1 (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
22′–0″	123	2790	127	117	109	101	95	90	85	80	76	73	69	66	63	61	59	54	51
	124	3480	158	146	136	127	119	112	105	100	95	91	86	83	79	76	73	68	63
	125	4300	196	181	168	157	147	138	130	124	117	112	107	102	98	94	90	84	78
	126	5300	241	223	207	193	181	170	161	152	145	138	132	126	121	116	111	103	97
	145	4730	215	199	185	172	162	152	144	136	129	123	117	112	108	103	100	92	86
	146	6200	282	260	242	226	212	199	188	178	169	161	154	147	141	135	130	121	111
	147	6800	309	285	265	247	232	218	206	195	185	177	168	161	154	148	143	132	123
	166	6400	291	269	250	233	218	206	194	184	175	166	159	152	146	140	134	125	116
	167	7200	327	302	280	262	245	231	218	206	196	187	178	171	164	157	151	140	131
22′–6″	123	2730	121	112	104	97	91	86	81	77	73	69	66	63	61	58	56	52	48
	124	3410	152	140	130	121	114	107	101	96	91	87	83	79	76	73	70	65	61
	125	4210	187	173	160	150	140	132	125	118	112	107	102	98	94	90	86	80	75
	126	5180	230	213	197	184	173	163	154	146	138	132	126	120	115	111	106	99	92
	145	4620	205	189	176	164	154	145	137	130	123	117	112	107	103	99	95	88	82
	146	6060	269	249	231	215	202	190	180	170	162	154	147	141	135	129	124	115	108
	147	6800	302	279	259	242	227	214	202	191	181	173	165	158	151	145	140	130	121
	166	6400	284	263	244	228	214	201	190	180	171	163	155	149	142	137	131	122	114
	167	7200	320	296	274	256	240	226	214	202	192	183	175	167	160	154	148	137	128
23′–0″	123	2670	116	107	100	93	87	82	77	73	70	66	63	61	58	56	54	50	46
	124	3330	145	134	124	116	109	102	97	92	87	83	79	76	72	70	67	62	58
	125	4120	179	165	154	143	134	126	119	113	107	102	98	94	90	86	83	77	72
	126	5060	221	203	189	176	165	155	147	139	132	126	120	115	110	106	102	94	88
	145	4520	197	182	169	157	147	139	131	124	118	112	107	103	98	95	91	84	79
	146	5940	258	238	221	206	194	182	172	163	155	147	141	135	129	124	119	111	103
	147	6800	296	273	254	237	222	209	197	187	178	169	161	154	148	142	137	127	118
	166	6400	278	257	238	223	209	197	186	176	167	159	152	145	139	134	128	119	111
	167	7200	313	289	268	250	235	221	209	198	188	179	171	163	157	150	144	134	125
23′–6″	123	2610	111	103	95	89	83	78	74	70	67	64	61	58	56	53	51	48	44
	124	3260	139	128	119	111	104	98	93	88	83	79	76	72	70	67	64	59	56
	125	4040	172	159	147	138	129	121	115	108	103	98	94	90	86	83	80	74	69
	126	4960	211	195	181	169	158	149	141	133	127	121	115	110	106	101	97	90	84
	145	4430	189	174	162	151	141	133	126	119	113	108	103	98	94	91	87	81	76
	146	5800	247	228	212	198	185	174	165	156	148	141	135	129	123	119	114	106	99
	147	6800	290	267	248	232	217	204	193	183	174	165	158	151	145	139	134	124	116
	166	6400	272	252	234	218	204	192	182	172	164	156	149	142	136	131	126	117	109
	167	7200	306	283	263	245	230	216	204	194	184	175	167	160	153	147	142	131	123
24′–0″	123	2550	106	98	91	85	80	75	71	67	64	61	58	55	53	51	49	46	42
	124	3190	133	123	114	106	100	94	89	84	80	76	73	69	67	64	61	57	53
	125	3950	164	152	141	132	124	116	110	104	99	94	90	86	82	79	76	71	66
	126	4860	202	187	174	162	152	143	135	128	121	116	110	105	101	97	93	87	81
	145	4340	180	167	155	145	135	127	120	114	108	103	99	94	90	87	83	77	72
	146	5690	237	219	203	190	178	168	158	150	142	135	129	124	119	114	110	102	95
	147	6800	283	261	242	226	212	200	189	179	170	162	155	148	142	136	131	121	113
	166	6400	267	246	228	214	200	188	178	168	160	152	145	139	133	128	123	114	107
	167	7200	300	277	257	240	225	212	200	190	180	171	164	157	150	144	138	129	120
24′–6″	145	4250	174	160	149	139	130	122	116	110	104	99	95	91	87	83	80	74	69
	146	5570	227	210	195	182	170	160	151	143	136	130	124	119	114	109	105	98	91
	147	6690	273	252	234	218	205	192	182	172	163	156	149	142	136	131	126	117	109
	166	6310	258	238	221	206	193	182	172	163	155	147	141	135	129	124	119	110	103
	167	7200	294	271	252	235	221	208	196	186	176	168	160	153	147	141	136	126	117
25′–0″	145	4160	166	153	142	133	125	117	111	105	100	95	91	87	83	80	77	71	66
	146	5450	218	201	187	174	163	154	145	137	131	125	119	114	109	105	101	93	87
	147	6560	262	242	225	210	197	185	175	166	157	150	143	137	131	126	121	112	105
	166	6180	247	229	212	198	186	175	165	156	148	141	135	129	124	119	114	106	99

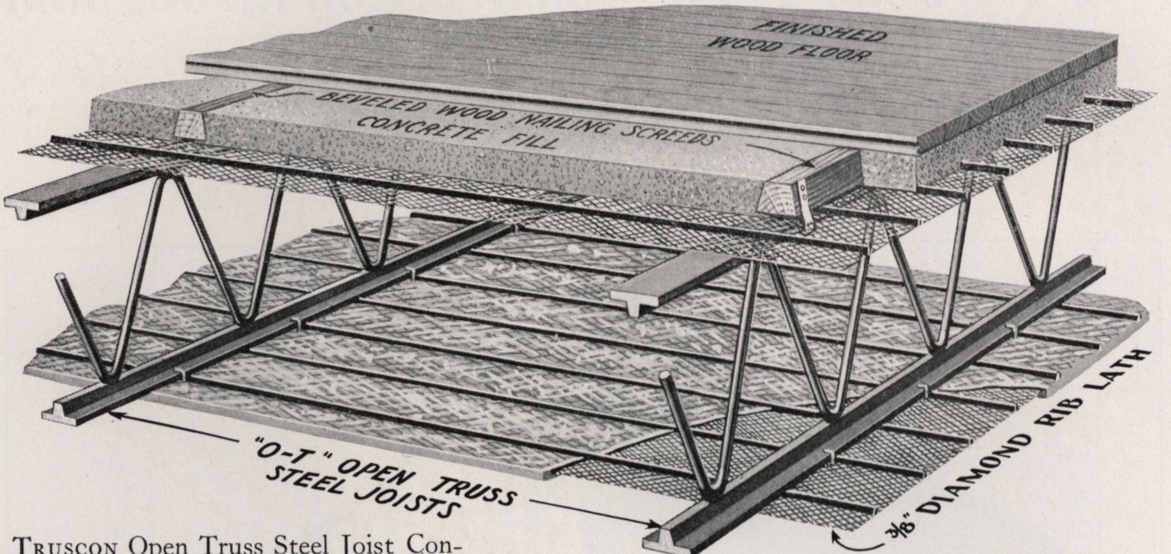
TABLE No. 1 (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
25′–0″	167	7200	288	266	247	230	216	204	192	182	173	165	157	150	144	138	133	123	115
25′–6″	145	4080	160	148	137	128	120	113	107	101	96	91	87	83	80	77	74	69	64
	146	5350	210	194	180	168	158	148	140	133	126	120	114	110	105	101	97	90	84
	147	6430	252	233	216	202	189	178	168	159	151	144	137	131	126	121	116	108	101
	166	6060	238	220	204	190	178	168	159	150	143	136	130	124	119	114	110	102	95
	167	7200	282	261	242	226	212	199	188	178	170	162	154	148	141	136	130	121	113
26′–0″	145	4000	154	142	132	123	115	108	102	97	92	88	84	80	77	74	71	66	61
	146	5250	202	187	173	162	152	143	135	128	121	115	110	105	101	97	93	87	81
	147	6300	243	224	208	194	182	171	162	153	146	138	132	127	121	116	112	104	97
	166	5950	229	211	196	183	172	162	153	145	137	131	125	119	115	110	106	98	92
	167	7200	277	256	237	222	208	196	184	175	166	158	151	145	139	133	128	119	111
26′–6″	145	3920	148	137	127	118	111	105	99	94	89	85	81	77	74	71	68	63	59
	146	5150	194	179	167	155	146	137	130	123	117	111	106	101	97	93	90	83	78
	147	6180	234	216	200	187	175	165	156	147	140	133	127	122	117	112	108	100	93
	166	5840	220	203	189	176	165	155	147	139	132	126	120	115	110	106	102	94	88
	167	7060	267	246	229	213	200	188	178	168	160	152	146	139	133	128	123	114	107
27′–0″	145	3850	143	132	122	114	107	101	95	90	86	82	78	75	71	69	66	61	57
	146	5050	187	173	160	150	140	132	125	118	112	107	102	98	94	90	86	80	75
	147	6070	225	208	193	180	169	159	150	142	135	129	123	117	112	108	104	96	90
	166	5730	212	196	182	170	159	150	141	134	127	121	116	111	106	102	98	91	85
	167	6940	257	237	220	206	193	181	171	162	154	147	140	134	128	123	119	110	103
27′–6″	145	3780	137	127	118	110	103	97	92	87	83	79	75	72	69	66	63	59	55
	146	4960	180	166	154	144	135	127	120	114	108	103	98	94	90	87	83	77	72
	147	5960	217	200	186	173	162	153	144	137	130	124	118	113	108	104	100	93	86
	166	5630	204	189	175	164	154	144	136	129	123	117	112	107	102	98	94	88	82
	167	6810	248	229	212	198	186	175	165	156	149	142	135	129	124	119	114	106	99
28′–0″	145	3720	133	123	114	106	100	94	89	84	80	76	72	69	66	64	61	57	53
	146	4880	174	161	149	139	131	123	116	110	105	100	95	91	87	84	81	75	70
	147	5850	209	193	179	167	157	147	139	132	125	120	114	109	105	100	96	90	84
	166	5520	197	182	169	158	148	139	131	124	118	113	107	103	99	95	91	84	79
	167	6690	239	221	205	191	179	169	159	151	143	137	130	125	119	115	110	102	96
28′–6″	166	5430	191	176	163	152	143	135	127	120	114	109	104	100	96	92	88	82	76
	167	6570	230	213	197	184	173	163	153	145	138	132	126	120	115	110	106	98	92
29′–0″	166	5340	184	170	158	147	138	130	123	116	111	105	100	96	92	88	85	79	74
	167	6460	223	206	191	178	167	157	148	141	134	127	122	116	111	107	103	96	89
29′–6″	166	5240	178	164	152	142	133	125	118	112	107	102	97	93	89	86	82	76	71
	167	6350	215	198	184	172	162	152	143	136	129	123	117	112	108	103	99	92	86
30′–0″	166	5150	172	159	147	138	129	121	114	109	103	98	94	90	86	83	79	74	69
	167	6240	208	192	178	167	156	147	139	131	125	119	113	108	104	100	96	89	83
30′–6″	166	5070	166	153	142	133	125	117	111	105	100	95	91	87	83	80	78	71	67
	167	6140	201	186	172	161	151	142	134	127	121	115	110	105	100	97	93	86	81
31′–0″	166	4990	161	149	138	129	121	114	107	102	97	92	88	84	81	77	74	69	64
	167	6050	195	180	167	156	146	138	130	123	117	111	106	102	98	94	90	84	78
31′–6″	166	4910	156	144	134	125	117	110	104	99	94	89	85	81	78	75	72	67	62
	167	5950	189	174	162	151	142	133	126	119	113	108	103	99	95	91	87	81	76
32′–0″	166	4840	151	140	130	121	113	107	101	96	91	86	82	79	76	73	70	65	60
	167	5860	183	169	157	146	137	129	122	116	110	105	100	96	92	88	85	79	73

A ten story Apartment with "O-T" Joist Floor Construction throughout

ARLINGTON APARTMENTS, PITTSBURGH, PA.
Philip M. Julien, Architect
Sumner-Sollitt Company, Contractors

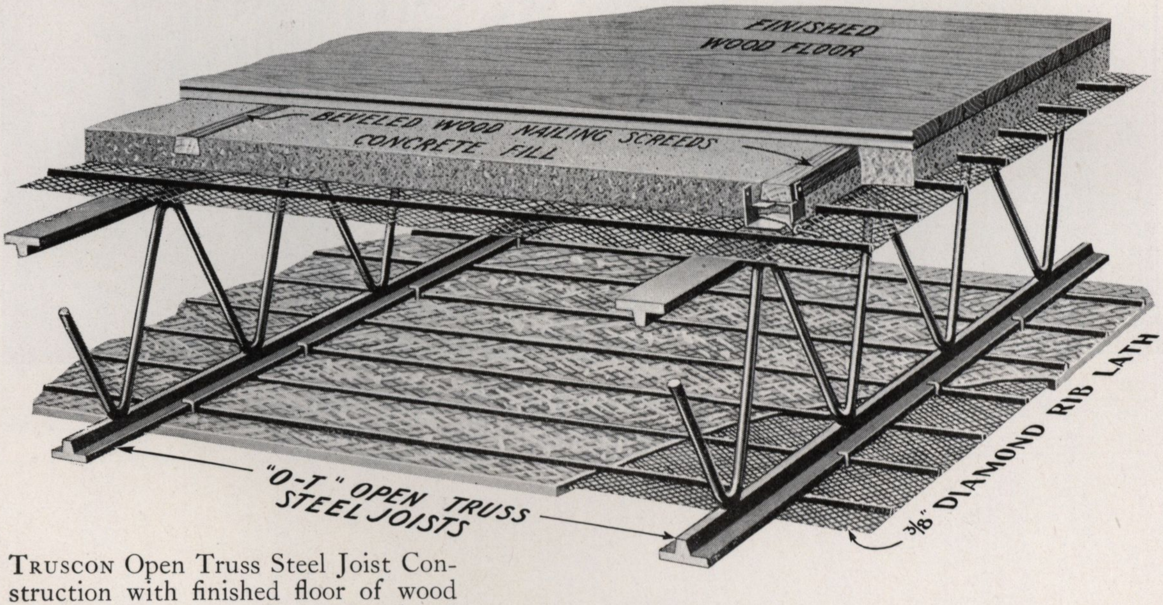
Construction Details



TRUSCON Open Truss Steel Joist Construction with finished floor of wood secured by means of screeds placed directly over the joists and resting on the ribs of the metal lath.

3/8″ Diamond Rib Lath for floor and ceiling.

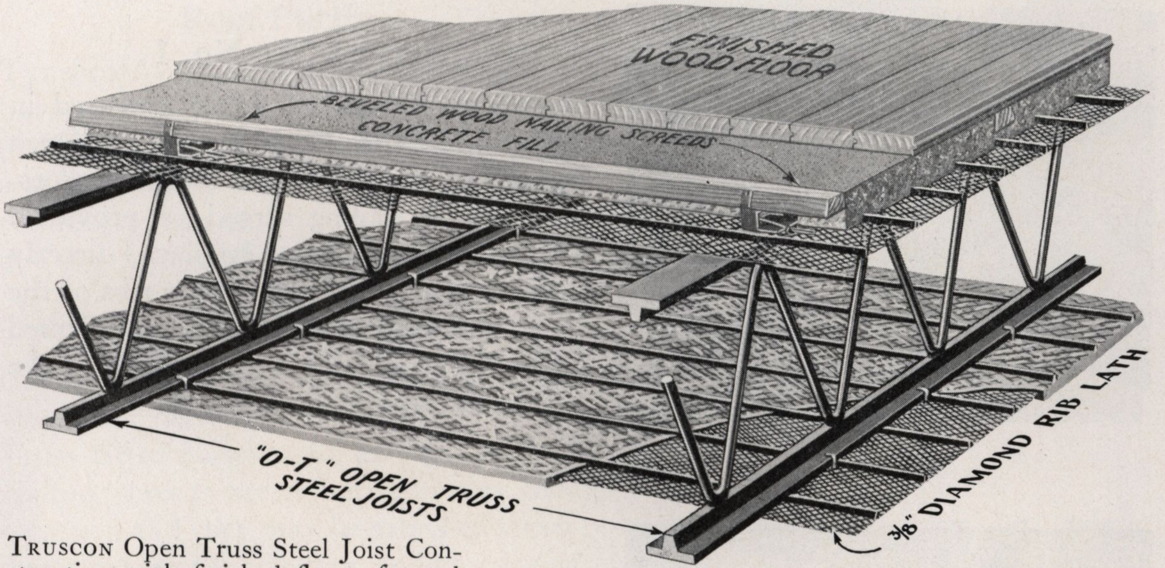
In Steel Joist Construction, the finished floor surface can be wood, cement or composition as desired. Wood nailing screeds for attaching wood floors may be placed either directly over the joists and resting on the ribs of the metal lath or elevated.



TRUSCON Open Truss Steel Joist Construction with finished floor of wood secured by means of screeds placed directly over the joists and elevated to provide for concrete underneath.

3/8″ Diamond Rib Lath for floor and ceiling.

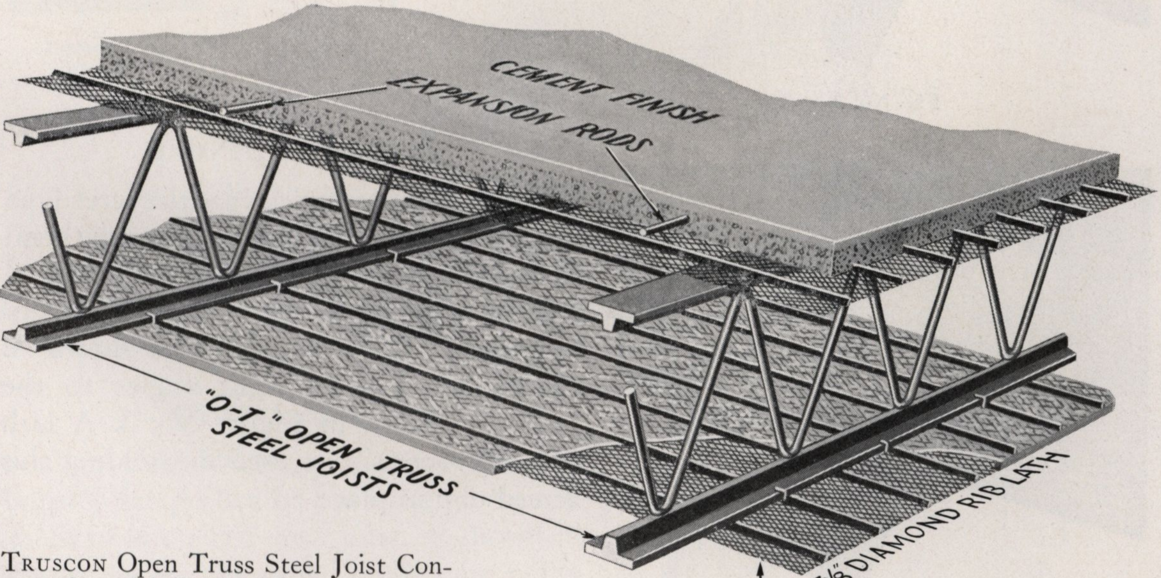
Construction Details



Truscon Open Truss Steel Joist Construction with finished floor of wood secured by means of screeds placed at right angles to the joists and elevated to provide for concrete underneath.

3/8" Diamond Rib Lath for floor and ceiling.

When the screeds are elevated they can be placed either parallel to and directly over the joists or at right angles to them. The above illustration and the one at the bottom of page 14 show these conditions. Below is shown the standard construction for cement or composition surfacing.



Truscon Open Truss Steel Joist Construction with finished floor of cement. 3/8" Diamond Rib Lath for floor and ceiling.

Construction Details

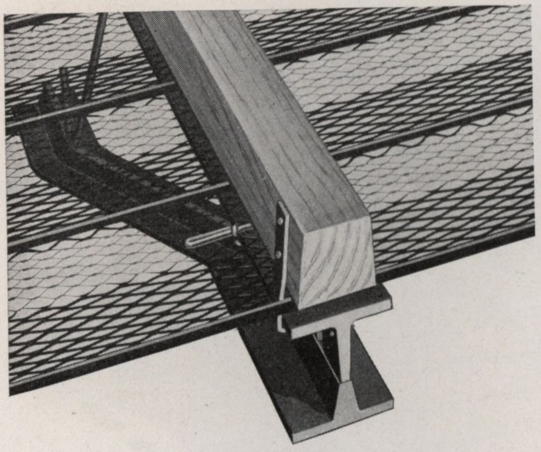


Fig. No. 1

Screed Clip No. 1

WHEN wood finished floors are used in connection with Truscon "O-T" Open Truss Steel Joist Construction, it is necessary that a nailing screed be provided. When the screeds are to be placed directly over the joists and rest on the ribs of the metal lath as shown in Figure No. 1, Screed Clips No. 1 should be specified, to be spaced 16″ apart and staggered.

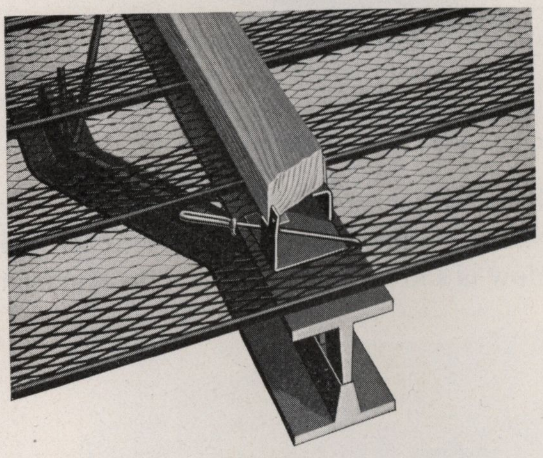
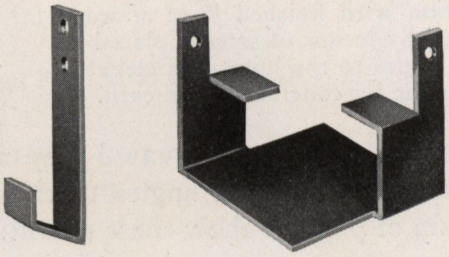


Fig. No. 2



Screed Clip No. 1 Screed Clip No. 3

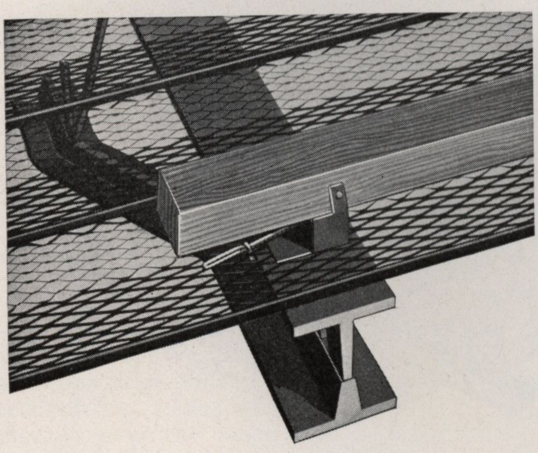


Fig. No. 3

Screed Clip No. 3

WHEN it is desired to elevate the screeds so that concrete can be poured beneath them, Screed Clips No. 3 should be specified regardless of whether the screeds are to be placed above the joists as shown in Figure No. 2 or at right angles to the joists as shown in Figure No. 3. A lath clip of proper size is used for holding this screed clip in place.

Construction Details

Roof Purlins

Truscon "O-T" Open Truss Steel Joists have proved to be very economical and practical for use as roof purlins supporting steeldeck roofs. The method of attaching the roof to the steel joists is very simple and positive, as shown in Figure No. 4.

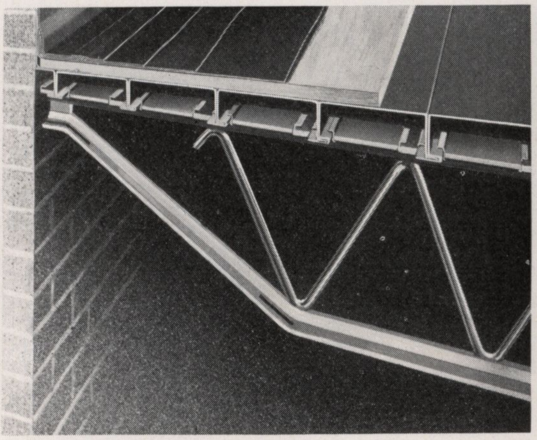
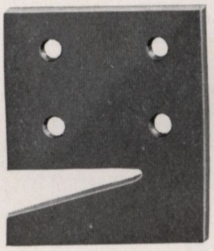


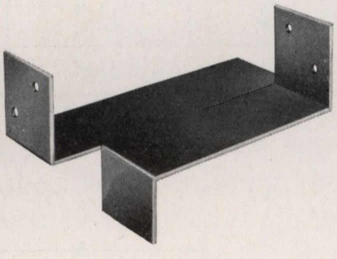
Fig. No. 4

Nailing Screed

Occasionally, it is desired to attach a wood roof deck to Truscon "O-T" Open Truss Steel Joists used as roof purlins. Nailing screeds are required in this construction and they may be attached either directly over the joists or at right angles to them.



Screed Clip No. 2



Screed Clip No. 4

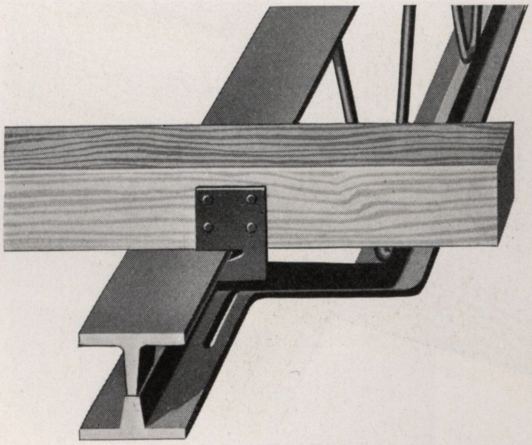


Fig. No. 5

Screed Clip No. 2

Figure No. 5 shows the screed held at right angles to the steel joist and ready for the attachment of the wood deck. The screed clips should be applied to both sides of the screeds.

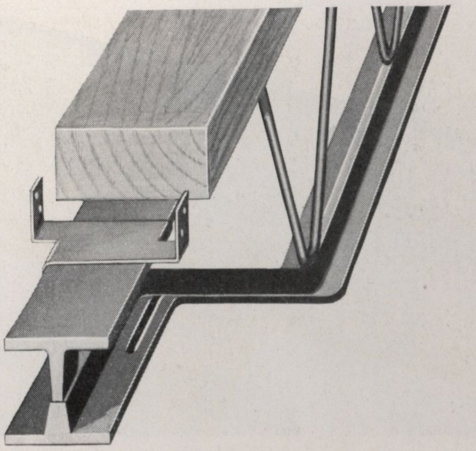


Fig. No. 6

Screed Clip No. 4

Screed Clip No. 4 is made so that the bottom flanges can be bent around the top chord of any sized steel joist, as shown in Figure No. 6. The upper flanges are made to receive a commercial 2″x4″ wood screed.

Construction Details

Lath Clips

THE clips used in attaching metal lath to Truscon "O-T" Open Truss Steel Joists are made of No. 12½ gauge wire in dimensions as listed in the accompanying table.

The lath clips are easily attached without the aid of special tools, and should be spaced 12″ apart for top lath and 8″ apart for ceiling lath.

Figure Nos. 7 and 8 show the use of lath clips for attaching top lath. The lath clip is placed between the ribs of the metal lath and attachment is completed by simply pressing the lever with the thumb.

Figure Nos. 9 and 10 show the method of attaching ceiling lath. Note that the lath clip crosses the rib of the metal lath.

Lath Clip Number	Dimen. A	Used on Joist Section Number
2	2⅜″	421, 422, 423, 424
3	2$\frac{11}{16}$″	425, 426, 427

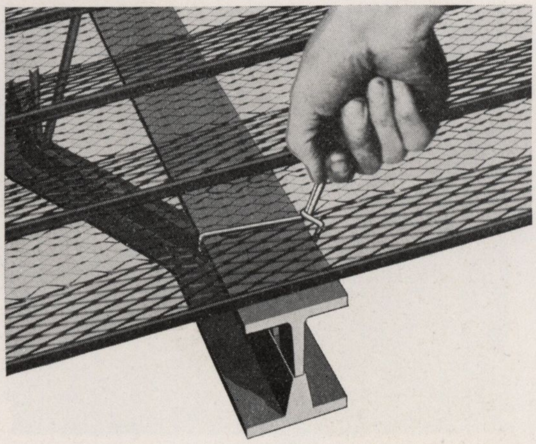


Fig. No. 7

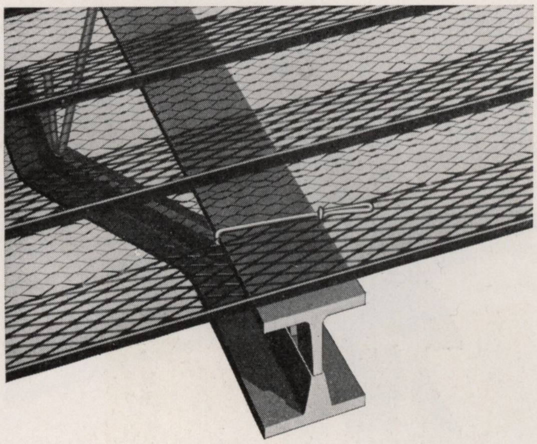
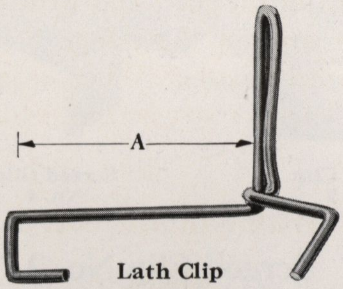


Fig. No. 8



Lath Clip

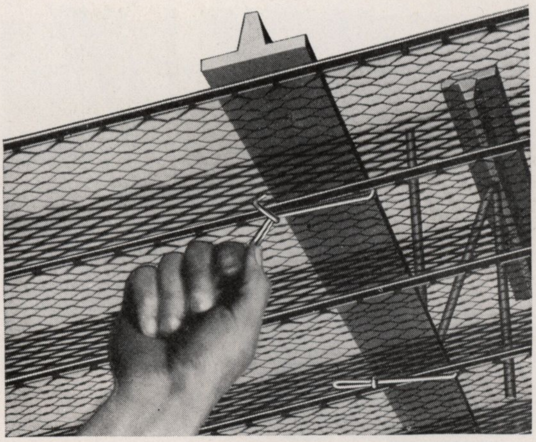


Fig. No. 9

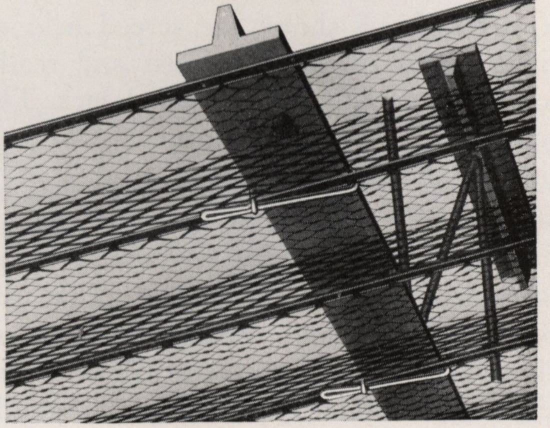
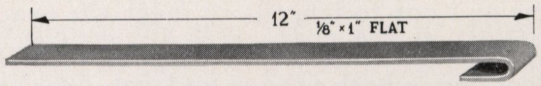


Fig. No. 10

Construction Details

Wall Anchor No. 2



WHEREVER steel joists are parallel to a masonry wall, each line of bridging should be anchored as shown in Figure No. 11.

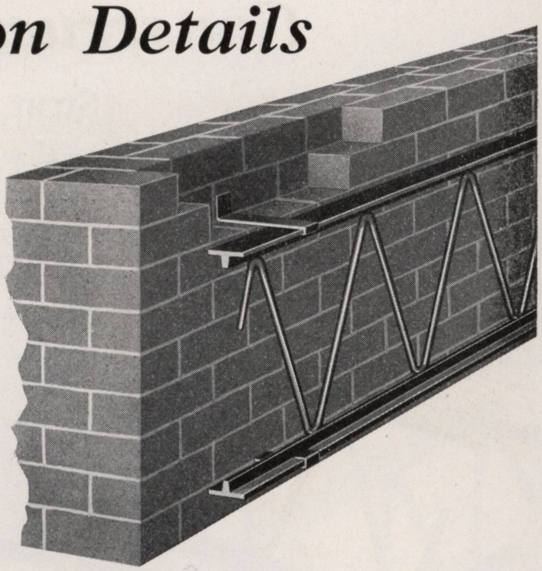
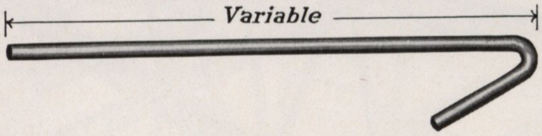


Fig. No. 11

Beam Anchor No. 3



WHEN joists rest on structural steel beams, they should be held in place by means of beam anchors No. 3. Figure No. 12 shows the bent end of the anchor inserted in the slot that is provided in the bottom chord of the joist and with the other end bent around the flange of the supporting steel member. When ordering, the required length must be specified.

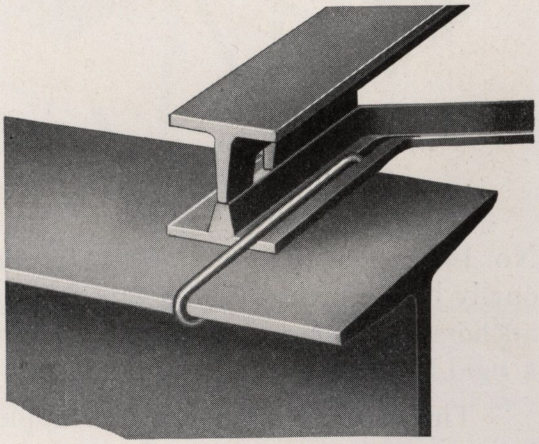
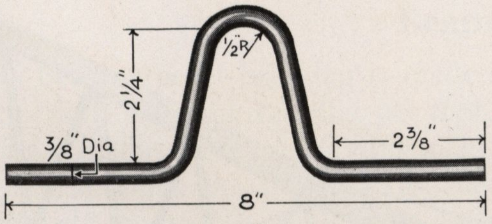


Fig. No. 12

Wall Anchor No. 5



WALL anchors made of 3/8" round rods and shaped as shown in Figure No. 13 should be used on every second or third joist as an additional bond between floor and wall construction when the wall is of such a height or nature as not to be self-sustaining.

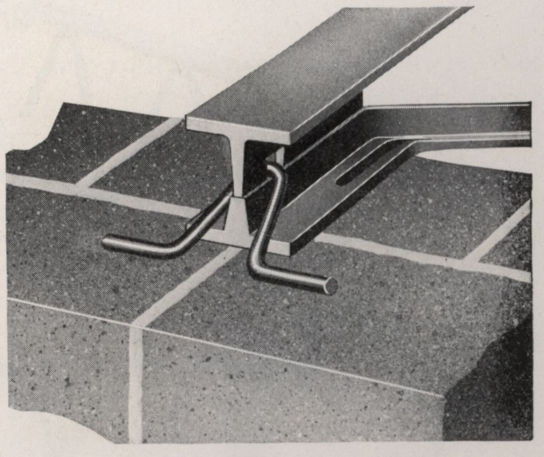
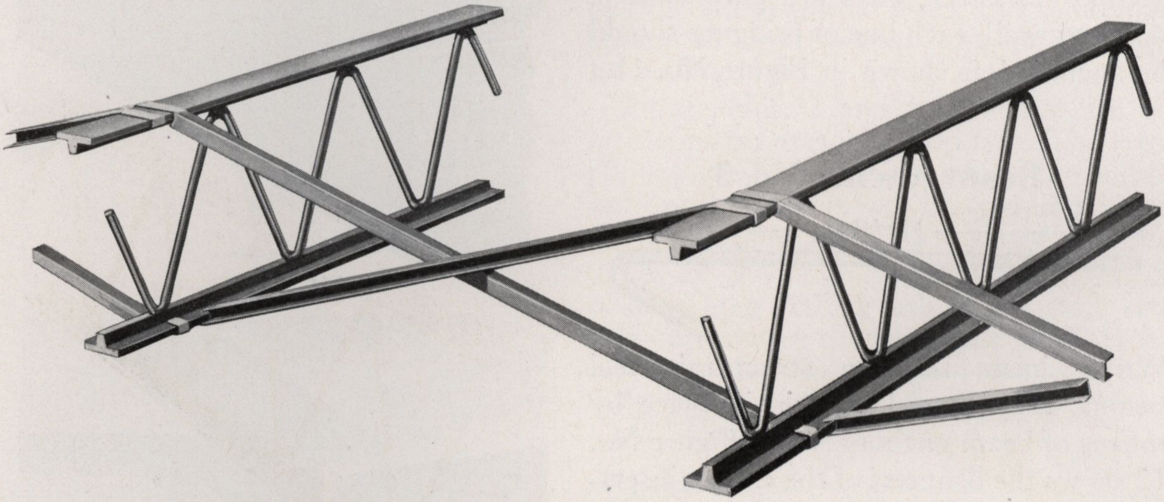


Fig. No. 13

Construction Details

Strut Bridging

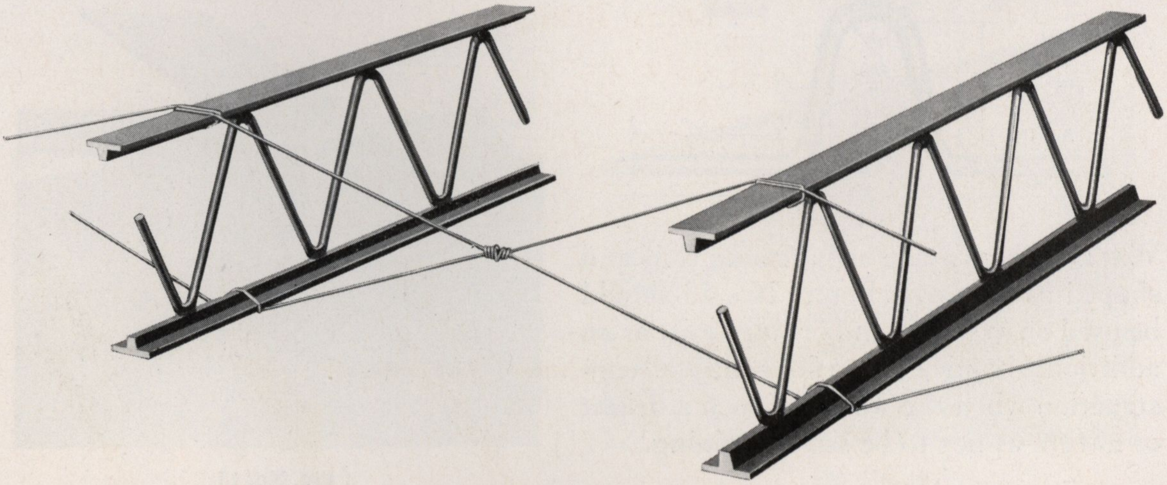
For rigid and economical bridging that can be easily installed, this type has proved very popular. It is made of ¾″ box channels and cut to lengths to meet the exact spacings of the joists. This strut bridging holds the joists in a vertical plane, assuring accurate spacing and distribution of loads by acting in both tension and compression.



Wire Bridging

No. 14 gauge wires are wrapped around each chord of steel joists and crossed diagonally between them. They are then twisted at their intersection for tension. Wall anchors, No. 2 if specified, can be used to connect the joists to masonry thus making a rigid anchorage for the bridging.

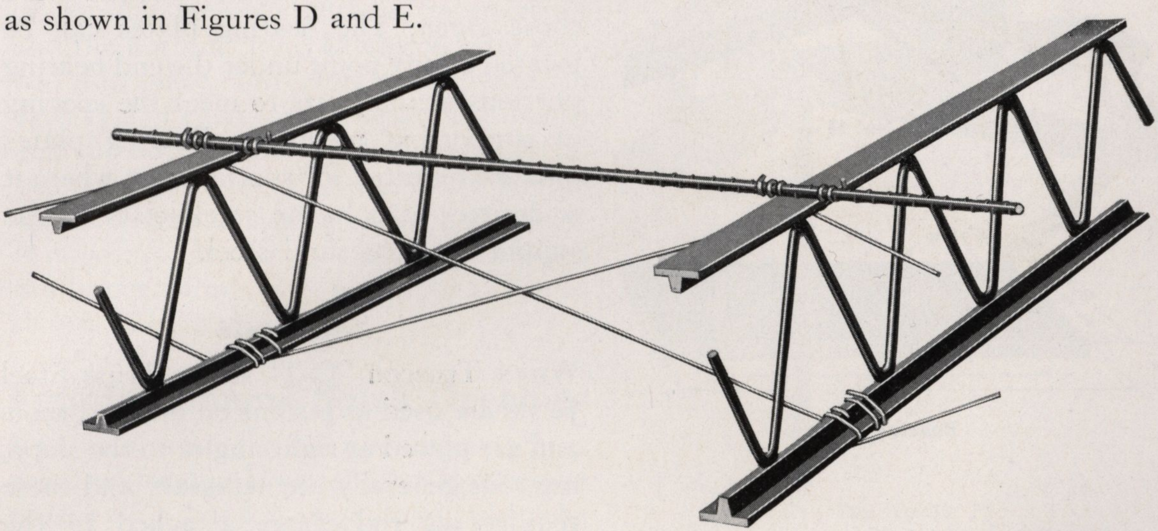
This type of bridging should supplement the No. 26 section channel beam bridging to stay the bottom chords of the joists. It is often used independently.



Construction Details

3/16″ Rod Bridging

This type of tension bridging is very effective. The ½″ deformed strut bar is placed on top of the steel joists and at right angles. The 3/16″ tension members are then applied by bending a hook at one end about 6″ long and placing as shown in Figure A. Next, bend the upper end over the strut bar as shown in Figure B and then, by means of the tool, tighten the lower end of the 3/16″ tension member as shown in Figures C and D. In similar manner, tighten the upper end around the ½″ strut bar as shown in Figures D and E.



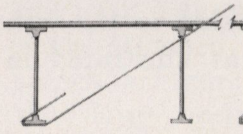


Fig. A

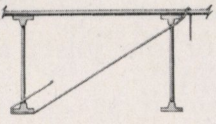


Fig. B

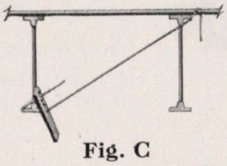


Fig. C

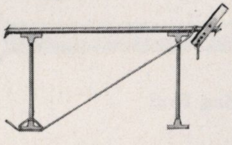


Fig. D

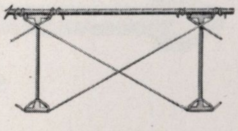
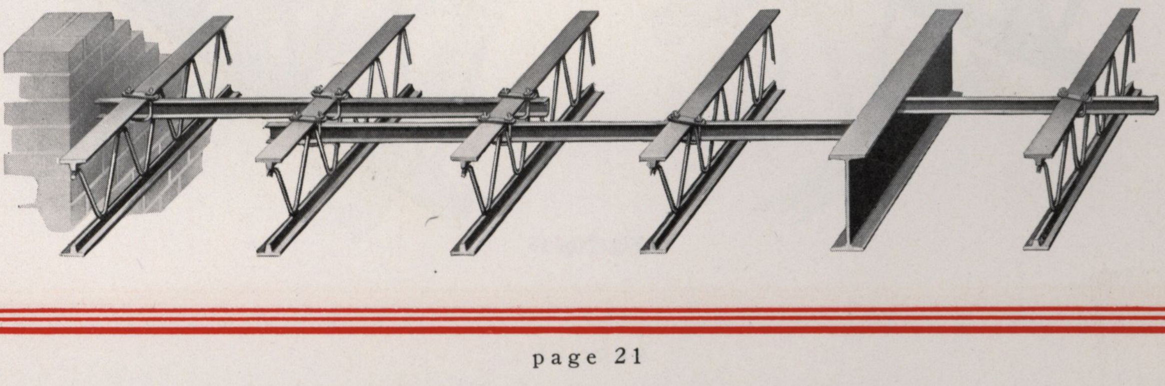


Fig. E

Beam Bridging

This beam type of bridging is made of 2″x1″ hot rolled structural channels (No. 26 Section) weighing 1.78 lbs. per foot, held in place by means of U bolts and cover plates. This bridging is easily installed and, by butting the ends against the parallel structural beams or masonry walls, the joists are stayed laterally. This type of bridging should be supplemented by 14 gauge wire bridging to stay the bottom chords.



Construction Details

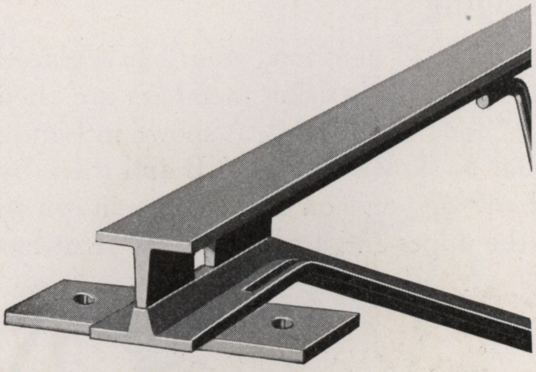
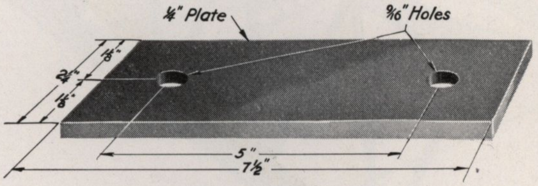


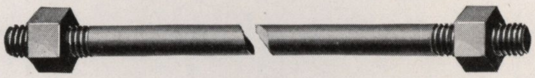
Fig. No. 14

Bearing Plates

When Truscon "O-T" Open Truss Steel Joists are used as purlins, it generally becomes necessary to attach bearing plates to the steel joists. These are arc welded to the ends of the joists as illustrated in Figure No. 14 and the standard dimensions are those given. The bearing plates can be located at any point under the end bearing portions of the joists to meet the spacing of supporting members. Bearing plates also are required for special cases where it is desired to bolt the steel joists to the supporting structural steel.



Bearing Plate



Sag Rod

Sag Rods

When Truscon "O-T" Open Truss Steel Joists are used as purlins on inclined roofs and are placed at right angles to the slope, sag rods generally are necessary and these require sag rod plates attached to the joists. These are arc welded to the web members of the joists as illustrated in Figure No. 15.

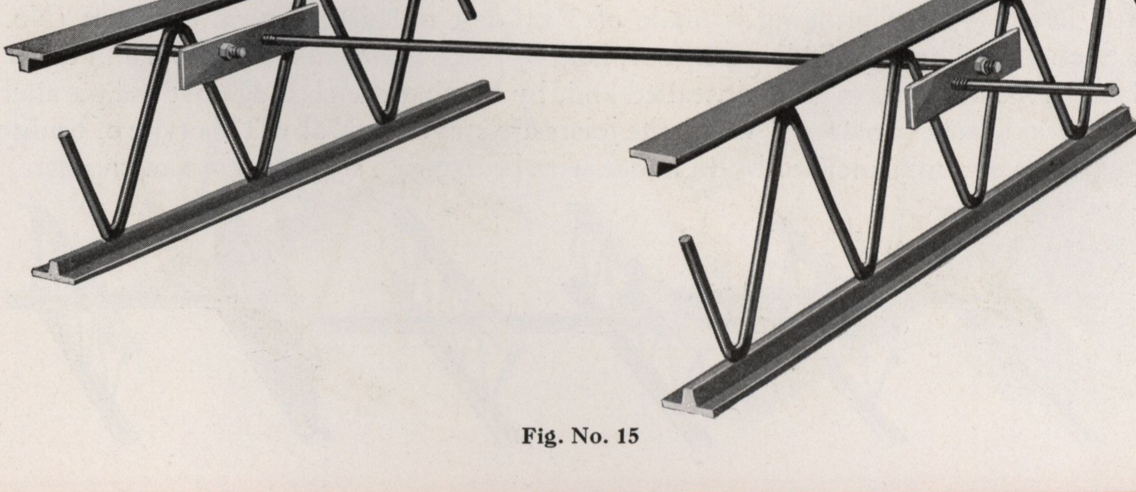


Fig. No. 15

Construction Details

Bottom Chord Extension

Detachable bottom chords are provided when plastered ceilings are to be attached directly to the joists, and are readily applied after the joists have been completely installed. Pipes of considerable lengths can thus be installed adjacent to the wall or bearing member without interference and the bottom chord extension later slipped into place. Two slots are provided in each end of each joist (one at each bend) and the bottom chord extension is slipped through the lower slot and hung in the upper. The extension can be locked securely in position by simply clinching it around the upper chord with a pair of pliers as shown in Figure No. 16.

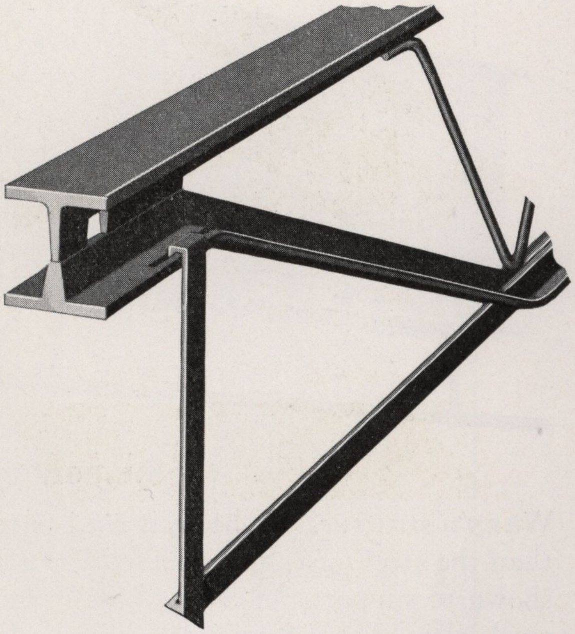


Fig. No. 16

Framing Around Small Openings

Framing around small openings, such as required for dumb waiters, can be done by means of a header angle to support the tail joist. The tail joist is bolted to a clip angle attached to the header angle as shown in Figure No. 17. We recommend that large openings be framed entirely with structural steel.

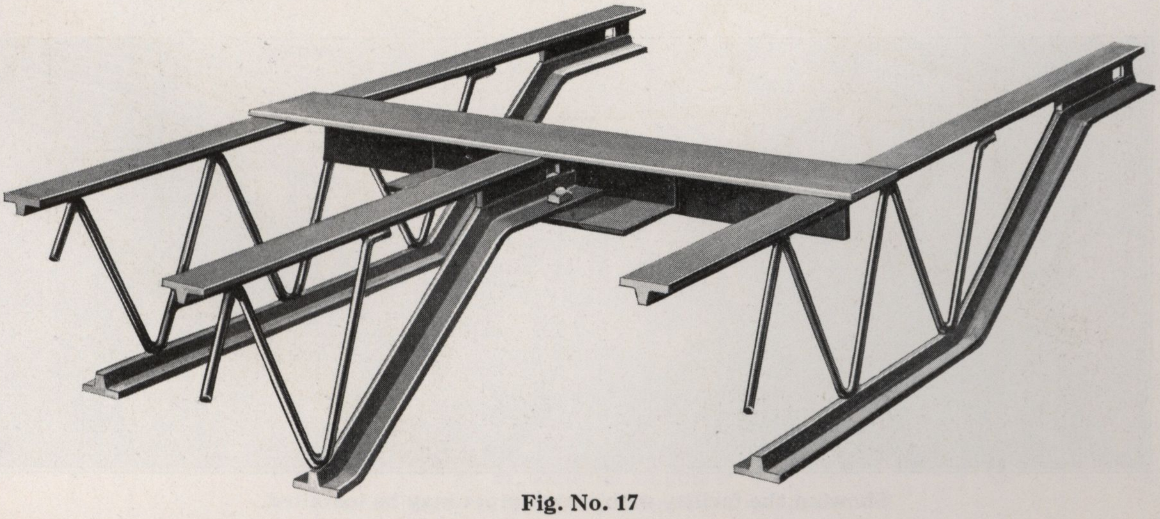
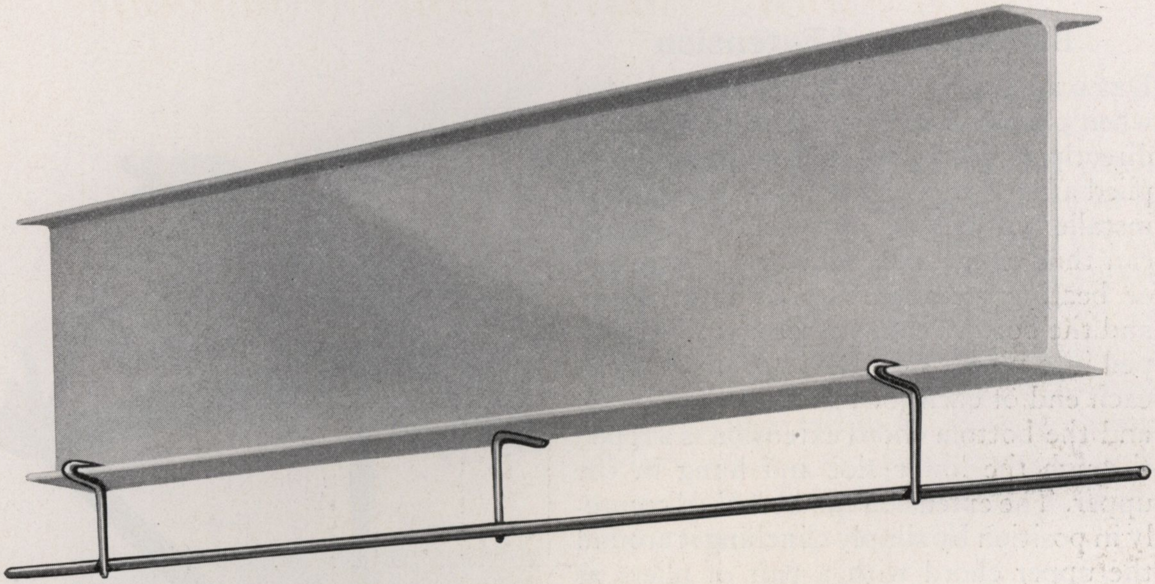


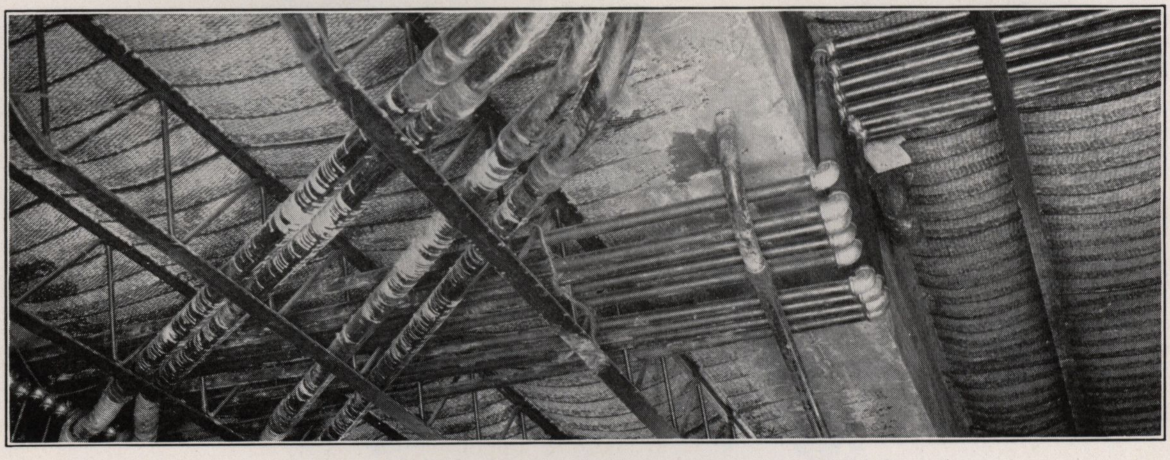
Fig. No. 17

Construction Details



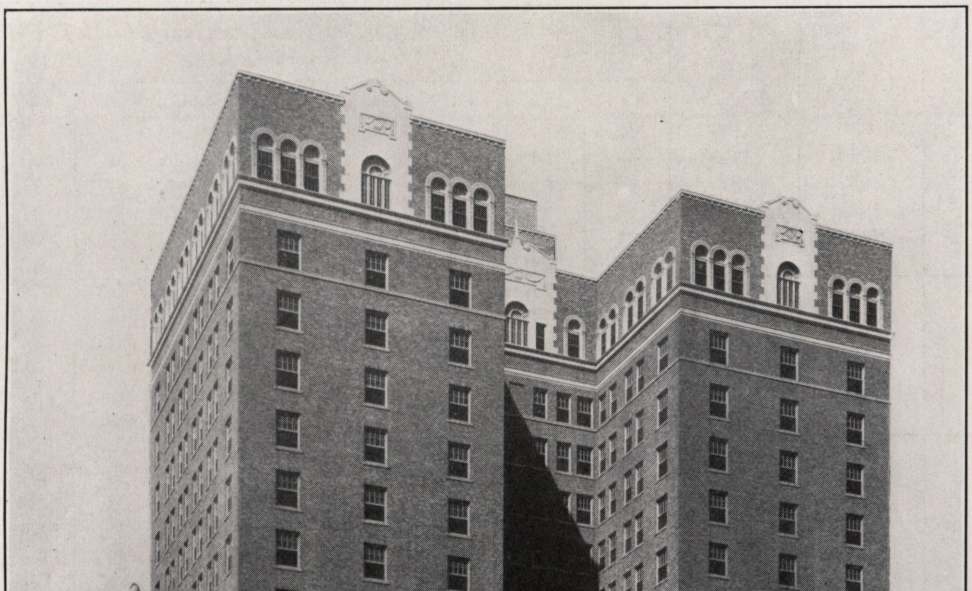
Suspended Furring Rod

When a structural tie beam is used to replace a steel joist and it is of a lesser depth than the steel joist, a Suspended Furring Rod of the required depth can be used as shown to support the ceiling lath at the same level as the ceiling lath beneath the steel joists. These Suspended Furring Rods are made of ¼″ round rods suspended by No. 9 galvanized wire hangers spaced 16″ between centers. The hangers are made to drive over the flange of the structural member and are staggered so that the attachment is made on alternate sides of the flange. This is the most practical and simple manner of accomplishing the desired result and removes all objection to the utilizing of the tie beam as a joist.



Showing the facility with which pipes may be installed.

A sixteen story Hotel with fireproof Steel Joist Floor Construction throughout



TEXAS STATE HOTEL, HOUSTON, TEXAS
Joseph Finger, Architect
H. M. Sanford, Engineer
C. R. Berry & Company, General Contractors

“O-T” Steel Joists Used as Purlins

The following table gives the TOTAL safe uniformly distributed load carrying capacities of Truscon “O-T” Open Truss Steel Joists at various spacings when used as purlins. The weight of DEAD loads must in all cases be deducted to determine the LIVE load carrying capacities of the joists.

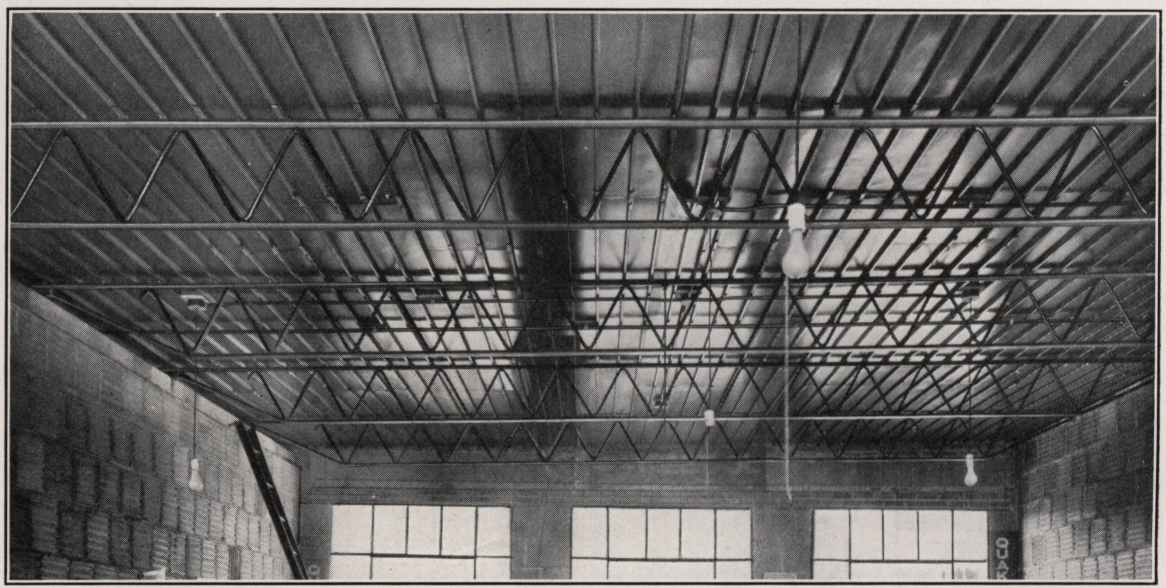
TABLE No. 2

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in pounds per square foot for various purlin spacings								
			3′-0″	3′-6″	4′-0″	4′-6″	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″
15′-0″	82	2330	52	44	39	35	31				
	102	2810	63	54	47	42	38	34	31		
	103	3640	81	69	61	54	49	44	41	37	35
	104	4400	98	84	73	65	59	53	49	45	42
	123	4090	91	78	68	61	55	50	46	42	39
	124	4600	102	88	77	68	61	56	51	47	44
16′-0″	82	2190	46	39	34	30					
	102	2630	55	47	41	36	33	30			
	103	3420	71	61	53	47	43	39	35	33	30
	104	4170	87	74	65	58	52	47	43	40	37
	123	3840	80	69	60	53	48	44	40	37	34
	124	4600	96	82	72	64	58	52	48	44	41
17′-0″	102	2470	48	42	36	32	29				
	103	3220	63	54	47	42	38	34	32	29	
	104	3910	77	66	58	51	46	42	38	35	33
	123	3610	71	61	53	47	43	39	35	32	30
	124	4510	88	76	66	59	53	48	44	41	38
	125	5000	98	84	74	65	59	54	49	45	42
18′-0″	102	2330	43	37	32	29					
	103	3040	56	48	42	38	34	31			
	104	3710	69	59	52	46	41	37	34	32	30
	123	3410	63	54	47	42	38	34	32	29	
	124	4260	79	68	59	53	47	43	39	36	34
	125	5000	93	79	70	62	56	51	46	43	40
	145	5400	100	86	75	67	60	55	50	46	43
19′-0″	102	2210	39	33	29						
	103	2880	51	43	38	34	30				
	104	3510	62	53	46	41	37	34	31		
	123	3230	57	49	42	38	34	31			
	124	4040	71	61	53	47	43	39	35	33	
	125	4990	88	75	66	58	53	48	44	40	38
	126	5400	95	81	71	63	57	52	47	44	41
	145	5480	96	83	72	64	58	53	48	44	41
	146	6200	109	93	82	73	65	59	55	50	47
20′-0″	102	2100	35	30							
	103	2730	46	39	34	30					
	104	3340	56	48	42	37	33	30			
	123	3060	51	44	38	34	31				
	124	3830	64	55	48	42	38	35	32	29	
	125	4740	79	68	59	53	47	43	40	36	34
	126	5400	90	77	68	60	54	49	45	42	39
	145	5200	87	74	65	58	52	47	43	40	37
	146	6200	103	89	78	69	62	56	52	48	44
21′-0″	123	2920	46	40	35	31					
	124	3650	58	50	43	39	35	32	29		
	125	4510	72	61	54	48	43	39	36	33	31
	126	5400	86	73	64	57	52	47	43	40	37
	145	4950	79	67	59	52	47	43	39	36	34

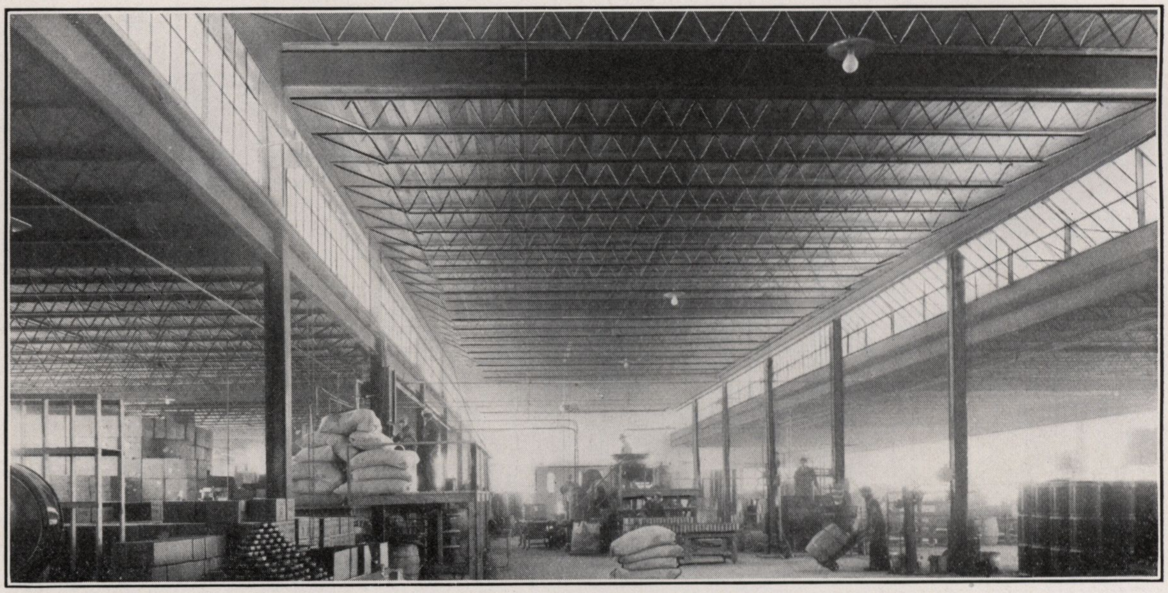
TABLE No. 2 (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in pounds per square foot for various joist spacings								
			3′-0″	3′-6″	4′-0″	4′-6″	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″
21′–0″	146	6200	99	84	74	66	59	54	49	45	42
	166	6800	108	93	81	72	65	59	54	50	46
22′-0″	123	2790	42	36	32						
	124	3480	53	45	40	35	32				
	125	4300	65	56	49	43	39	35	32	30	
	126	5300	80	69	60	54	48	44	40	37	34
	145	4730	72	61	54	48	43	39	36	33	31
	146	6200	94	80	70	63	56	51	47	43	40
	147	6800	103	88	77	69	62	56	52	47	44
	166	6400	97	83	73	65	58	53	48	45	42
23′-0″	123	2670	39	33	29						
	124	3330	48	41	36	32	29				
	125	4120	60	51	45	40	36	33	30		
	126	5060	74	63	55	49	44	40	37	34	31
	145	4520	66	56	49	44	39	36	33	30	
	146	5940	86	74	65	57	52	47	43	40	37
	147	6800	99	84	74	66	59	54	49	46	42
	166	6400	93	80	70	62	56	51	46	43	40
24′-0″	123	2550	35	30							
	124	3190	44	38	33	30					
	125	3950	55	47	41	37	33	30			
	126	4860	68	58	51	45	41	37	34	31	
	145	4340	60	52	45	40	36	33	30		
	146	5690	79	68	59	53	47	43	40	37	34
	147	6800	94	81	71	63	57	52	47	44	41
	166	6400	89	76	67	59	53	48	44	41	38
25′-0″	145	4160	56	48	42	37	33	30			
	146	5450	73	62	55	49	44	40	36	34	31
	147	6560	88	75	66	58	53	48	44	40	38
	166	6180	82	71	62	55	49	45	41	38	35
	167	7200	96	82	72	64	58	52	48	44	41
26′-0″	145	4000	51	44	38	34	31				
	146	5250	67	58	51	45	40	37	34	31	
	147	6300	81	69	61	54	49	44	41	37	35
	166	5950	76	65	57	51	46	42	38	35	33
	167	7200	92	79	69	62	55	50	46	43	40
27′-0″	145	3850	48	41	36	32	29				
	146	5050	62	53	47	42	37	34	31		
	147	6070	75	64	56	50	45	41	37	35	32
	166	5730	71	61	53	47	43	39	35	33	30
	167	6940	86	74	64	57	51	47	43	40	37
28′-0″	145	3720	44	38	33	30					
	146	4880	58	50	44	39	35	32	29		
	147	5850	70	60	52	46	42	38	35	32	30
	166	5520	66	56	49	44	39	36	33	30	
	167	6690	80	68	60	53	48	43	40	37	34
29′-0″	166	5340	61	53	46	41	37	33	31		
	167	6460	74	64	56	50	45	41	37	34	32
30′-0″	166	5150	57	49	43	38	34	31			
	167	6240	69	59	52	46	42	38	35	32	
31′-0″	166	4990	54	46	40	36	32	29			
	167	6050	65	56	49	43	39	35	32	30	
32′-0″	166	4840	50	43	38	34	30				
	167	5860	61	52	46	41	37	33	31		

"O-T" Open Truss Steel Joists as Purlins



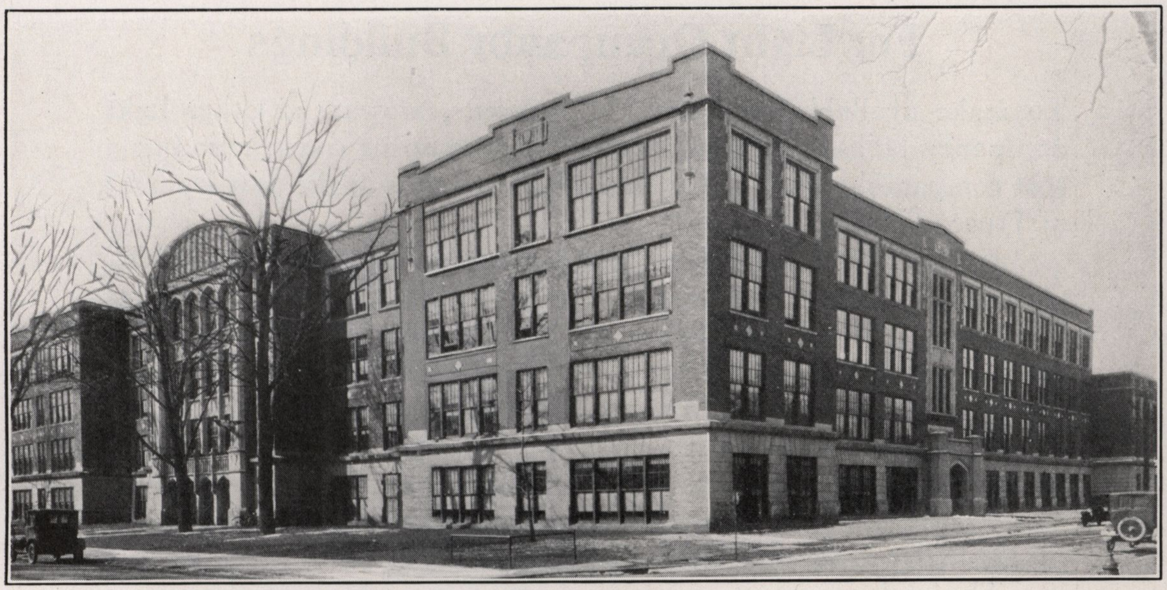
TRUSCON STEELDECK ROOF SUPPORTED BY TRUSCON "O-T" OPEN TRUSS STEEL JOISTS WHICH ARE USED AS PURLINS.



A WOOD ROOF SUPPORTED BY TRUSCON "O-T" OPEN TRUSS STEEL JOISTS USED AS PURLINS WITH NAILING SCREEDS AND SCREED CLIPS No. 4.

Described on page 17

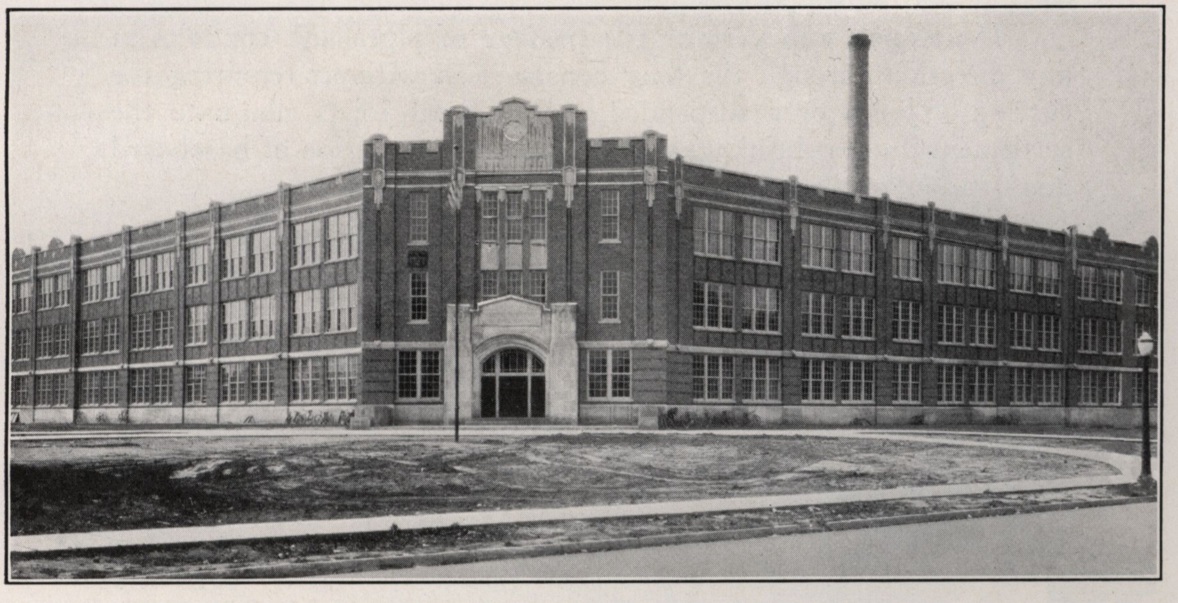
Schools with Fireproof Steel Joist Floor Construction



KALAMAZOO HIGH SCHOOL, KALAMAZOO, MICHIGAN

Leroy & Newlander, Architects

DeRight Brothers Construction Company, Contractors



FRENCH JR. HIGH SCHOOL, LANSING, MICHIGAN

J. N. Churchill, Architect

Reniger Construction Co., General Contractors

Truscon "O-T" Open Truss Nailer Joists

For Light Occupancy Buildings

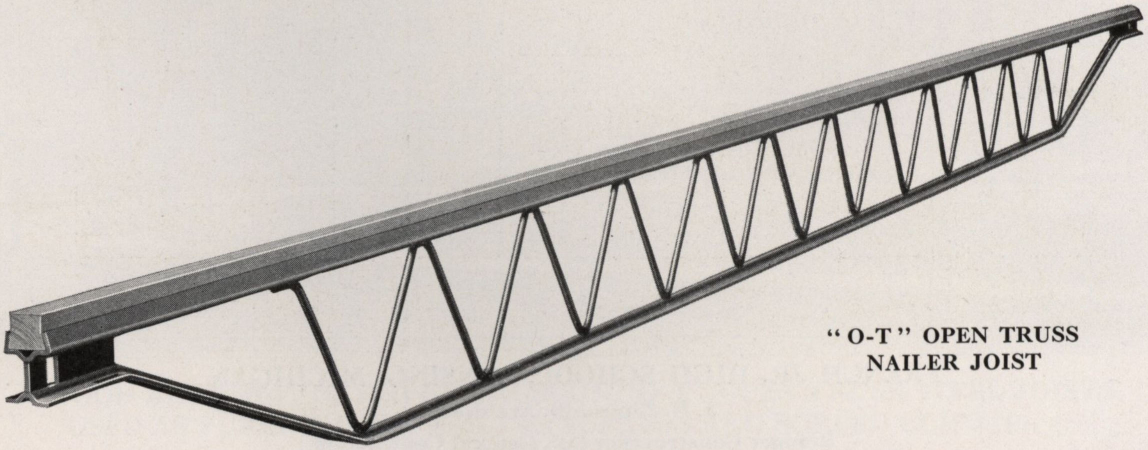
To make available for homes, apartments, stores and other light occupancy buildings the advantages of permanent construction at a cost comparable to wood has been the basic idea in the development of Truscon Nailer Joists.

In them are incorporated the basic features of Truscon "O-T" Open Truss Steel Joists, so extensively used in important buildings throughout the country. Unusual strength and rigidity result from their superior design and construction. Easy installation follows a complete and accurate fabrication in the Truscon plant.

Wide, specially-formed members for top and bottom chords impart stiffness to the Nailer Joists and keep them true to line. The continuous steel web member is securely welded to the chords by the high pressure electric welding process.

The end construction—a vital point in steel joist design—is unusually strong and rigid. Bearings for the joists are wide and ample. The underslung design at the supports not only insures stability of the joists during installation but provides additional head room under the supporting girders.

Their open web permits the passage of pipes and conduits in any direction through the floor construction without requiring the cutting of joists or a suspended ceiling. Steel Joists eliminate the settlement due to shrinkage and consequent separation of baseboard and floor, and its tendency to cause plaster cracking.



"O-T" OPEN TRUSS NAILER JOIST

Truscon "O-T" Open Truss Nailer Joists

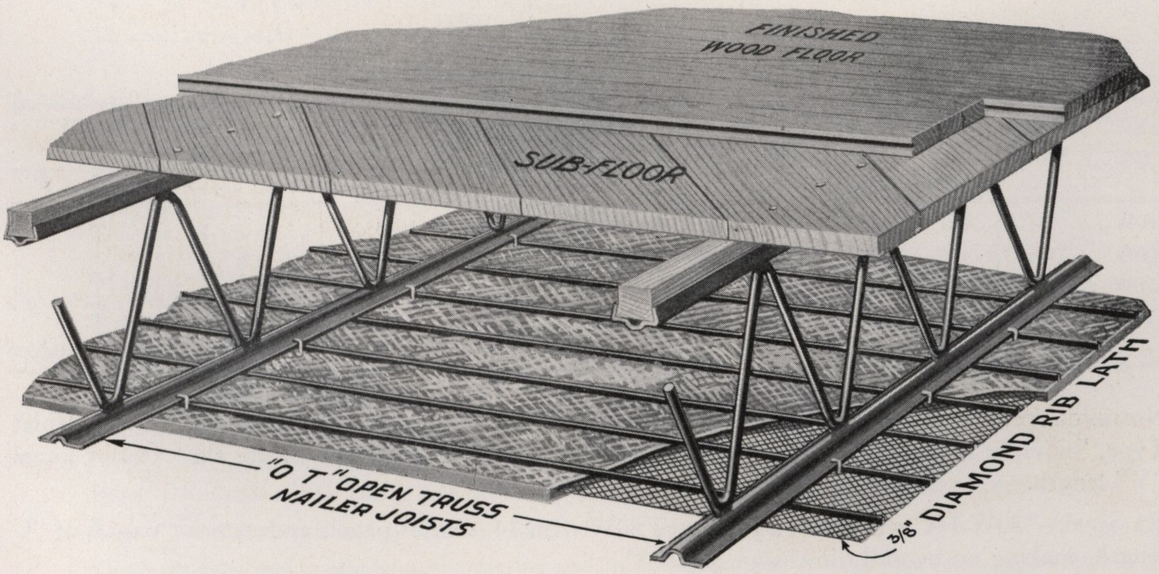
Advantages

Truscon Nailer Joists reach the job ready for placing without cutting or fitting. The wood flooring is nailed directly to the wood nailing strips which are securely attached to the top chords of the joists.

The light weight of nailer joist construction lessens the time and labor required for erection and also saves materials in the supporting framework and foundations. Every detail of joists and attachments has been perfected by practical experience to simplify installation and assure dependable results.

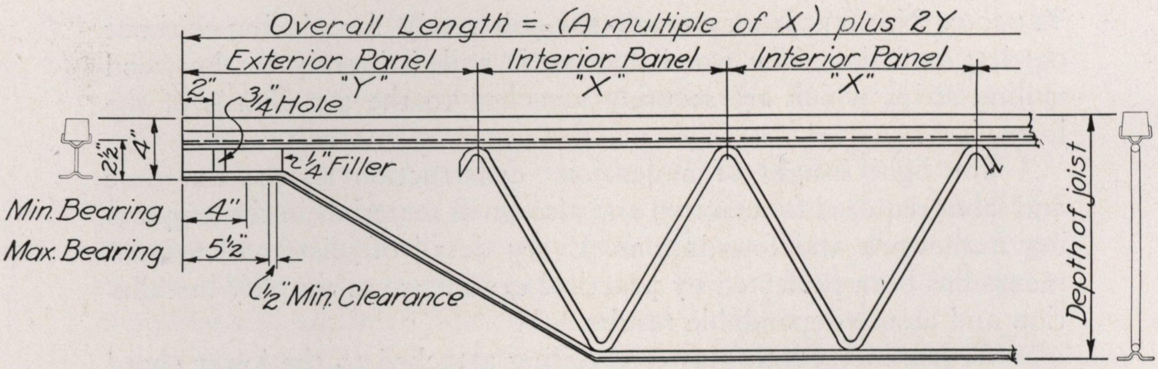
With a metal lath plastered ceiling attached to the lower chord of the joists, the construction provides fire-safety to a substantial degree, preventing the spread of fire from below. This fire protection is afforded without resort to the complicated centering and special equipment required for ordinary fireproof construction. Several floors can be installed at one time.

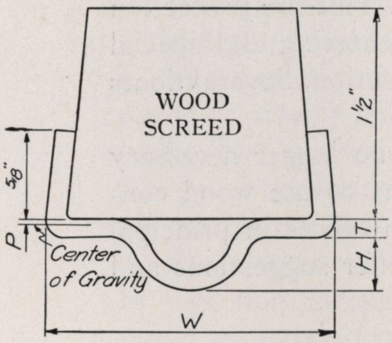
With Truscon Nailer Joists available it is no longer necessary from either a practical or economical standpoint to use wood construction in any building. Truscon Engineers in offices in principal cities will be glad to study your building and offer suggestions and estimates without obligation on your part.



Truscon "O-T" Open Truss Nailer Joists

Dimensions and Properties





PROPERTIES OF CHORD SECTIONS

Section Number	W	T	H	P	Area	I	r
410	2 1/32″	⅛″	⅜″	.003″	.43	.035	.284
411	3 3/32″	5/32″	11/32″	.019″	.691	.050	.269

For properties of bottom chord sections, see page 4.

JOIST DIMENSIONS AND PROPERTIES

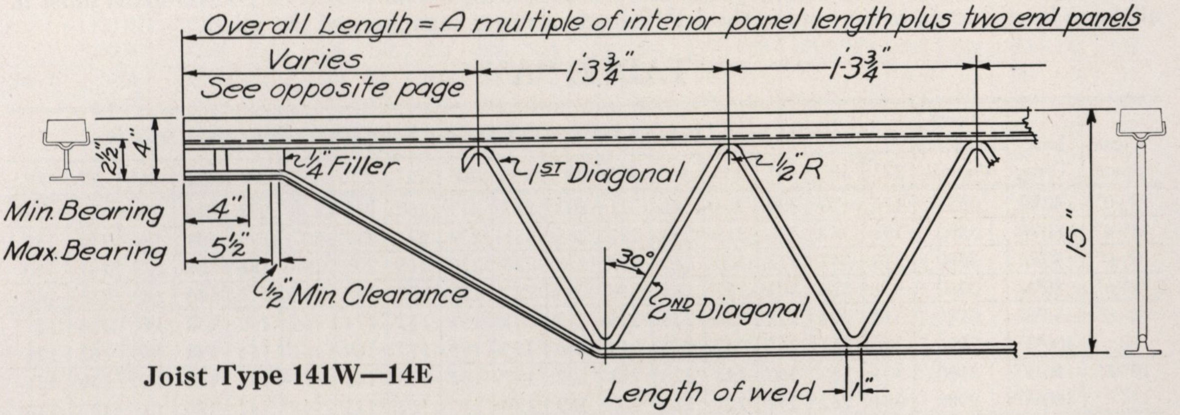
Joist Type	Joist Depth	Top Chord Section	Bottom Chord Section	Web	"X"	Exterior panel lengths are made in the following variable "Y" dimensions, and with these suffix letters.					
						A	B	C	D	E	F
80W	9½″	410	421	⅜″	9″	1′ 2½″	1′ 4″	1′ 5½″			
100W	11 5/16″	410	421	⅜″	11⅛″	1′ 4⅝″	1′ 6⅛″	1′ 7⅝″	1′ 9⅛″		
120W	13⅛″	410	421	7/16″	13⅝″	1′ 7⅛″	1′ 8⅝″	1′ 10⅛″	1′ 11⅝″	2′ 1⅛″	
121W	13⅜″	411	423	½″	13⅝″	1′ 7⅛″	1′ 8⅝″	1′ 10⅛″	1′ 11⅝″	2′ 1⅛″	
141W	15″	411	423	½″	15¾″	1′ 9¼″	1′ 10¾″	2′ 0¼″	2′ 1¾″	2′ 3¼″	2′ 4¾″

NOMENCLATURE:—The complete nomenclature of a joist is determined by combining the "Joist Type," number of interior "X" panels, and the proper suffix letter to indicate the exterior panel "Y" length.

EXAMPLE:—80W-14C represents a joist type 80W with 14 interior panels and exterior panels of "C length, making an overall dimension of 13′ 5″.

Truscon "O-T" Open Truss Nailer Joists

Typical Calculations



Joist Type 141W—14E

CALCULATION OF ALLOWABLE STRESS IN TOP CHORD:

Unsupported length = panel centers minus length of weld = 15¾"—1" = 14¾".

$$\text{Allowable stress} = fs = \frac{18000}{1 + \dfrac{l^2}{18000\ r^2}} = \frac{18000}{1 + \dfrac{14.75^2}{18000 \times .269^2}} = 15{,}450\#\ /\square'',\ \text{use } 15000\#\ /\square''.$$

CALCULATION OF RESISTING MOMENTS OF CHORD MEMBERS:

Top chord = 411 Section; Bottom Chord = 423 Section.

Effective depth = distance between centers of gravity of top and bottom chords = 15"—1½" — .019" — .205" = 13.275".

R. M. of Top Chord = .691□" x 15000 x 13.275" = 137,129 inch lbs.

R. M. of Bottom Chord = .582□" x 18000 x 13.275" = 138,597 inch lbs.

The resisting moment of the top chord governs because it is less than the R. M. of the bottom chord.

CALCULATION OF SAFE LOAD:

$$M = \frac{W\,l}{8}\ ;\ W = \frac{8M}{L \times 12} = \frac{8 \times 137{,}129}{L \times 12}$$

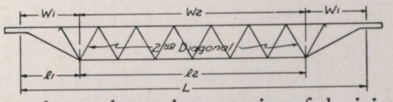
This value of W must not exceed twice the Max. End Reaction as calculated below.

CALCULATION OF ALLOWABLE STRESS IN WEB:

Web = ½" round; Unsupported length = $14\frac{1}{16}''$.

$$\text{Allowable stress} = fs = \frac{18000}{1 + \dfrac{14.0625^2}{18000 \times .125^2}} = 10{,}569\#\ /\square''$$

TO DETERMINE MAXIMUM END REACTION:



Beginning at the center of the joist and considering the load sustained by each compression web member, we find that the 2nd diagonal from each end sustains all load from its base to the center of the joist, and the remaining portion of the floor load is sustained by the end portion of the joist.

Therefore load W_2 equals twice the shear value of the 2nd. diagonal. This load W_2 divided by the distance l_2 gives the carrying capacity of the joist per lineal foot and, when multiplied by the clear span L, gives the total carrying capacity of the joist which is twice the end reaction.

CALCULATION OF 2ND DIAGONAL SHEAR VALUE:

V = fs x area x cos 30° = 10,569 x .1963 x .866 = 1796#

CALCULATION OF MAXIMUM END REACTION:

Assuming a clear span of 22'-0" and a joist type 141W, the complete nomenclature of the required joist would be 141W-14E (22' 11" overall). The distance l_2 would be 13 x 1' -3¾" or 17'-0¾".

$$\frac{2 \times 1796 \times 22}{17'\text{-}0\frac{3}{4}''} = 4640\#\ \text{or Max. End Reaction of } 2320\#.$$

PREPARATION OF SAFE LOAD TABLES:

From "Calculation of Safe Load," we obtain the value $W = \frac{8 \times 137{,}129}{L \times 12}$ but not to exceed 4640#.

$$\frac{8 \times 137{,}129}{22 \times 12} = 4150\#\ \text{safe load by resisting moment.}$$

This is the value used in calculating the carrying capacity of the joist, since it is the lesser of the two values.

Open Truss Nailer Joists

Truscon Steel Company, being a member company of the Steel Joist Institute, has designed all "O-T" Open Truss Nailer Joists in strict accordance with the specifications of the Institute.

THE following table gives the TOTAL safe uniformly distributed load carrying capacities of Truscon "O-T" Open Truss Nailer Joists at various spacings. The weight of DEAD loads must in all cases be deducted to determine the LIVE load carrying capacities of the joists.

TABLE "A"

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR VARIOUS JOIST SPACINGS																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
8′-0″	80W	3635	455	420	390	364	341	321	303	287	273	260	248	238	228	218	210	195	182
8′-6″	80W	3380	398	367	331	318	298	281	265	251	239	227	217	207	199	191	184	170	159
9′-0″	80W	3380	376	347	322	300	282	265	250	238	226	215	205	196	188	180	173	161	150
9′-6″	80W	3360	354	326	303	283	265	250	236	223	212	202	193	185	177	170	163	152	142
10′-0″	80W	3180	318	294	272	254	238	224	212	201	191	182	174	166	159	153	147	136	127
	100W	3090	309	285	265	247	232	218	206	195	185	177	169	161	154	148	143	132	124
10′-6″	80W	3190	304	280	260	243	228	214	202	192	182	173	166	159	152	146	140	130	121
	100W	2980	284	262	244	227	213	200	189	179	170	162	155	148	142	136	131	122	113
11′-0″	80W	3040	276	255	237	221	207	195	184	175	166	158	151	144	138	133	128	118	110
	100W	2980	271	250	232	217	203	191	181	171	163	155	148	141	135	130	125	116	108
11′-6″	80W	2910	253	234	217	202	190	179	169	160	152	145	138	132	127	121	117	108	101
	100W	2910	253	234	217	202	190	179	169	160	152	145	138	132	127	121	117	108	101
12′-0″	80W	2790	232	214	199	186	174	164	155	147	140	133	127	121	116	112	107	100	93
	100W	2910	242	224	208	194	182	171	162	153	146	139	132	127	121	116	112	104	97
	120W	4100	342	315	292	273	256	241	228	216	205	195	186	178	171	164	158	146	137
	121W	6020	502	464	430	402	376	354	334	317	301	287	274	262	251	241	232	215	201
12′-6″	80W	2680	214	198	184	171	161	151	143	135	129	122	117	112	107	103	99	92	86
	100W	2850	228	210	196	183	171	161	152	144	137	130	124	119	114	110	105	98	91
	120W	3940	315	290	270	252	236	222	210	199	189	180	172	164	157	151	145	135	126
	121W	6020	482	445	414	386	362	340	321	304	290	275	263	251	241	231	222	206	193
13′-0″	80W	2580	198	183	170	159	149	140	132	125	119	113	108	103	99	95	92	85	79
	100W	2850	219	202	188	175	164	155	146	138	132	125	120	114	110	105	101	94	88
	120W	3790	291	270	250	233	218	206	194	184	175	167	159	152	146	140	135	125	117
	121W	5720	440	405	377	352	330	310	293	278	264	251	240	230	220	211	203	189	176
13′-6″	80W	2480	184	170	157	147	138	130	122	116	110	105	100	96	92	88	85	79	74
	100W	2800	207	191	178	166	156	146	138	131	124	118	113	108	104	100	96	89	83
	120W	3650	270	250	232	216	203	191	180	171	162	154	147	141	135	130	125	116	108
	121W	5720	424	391	363	339	318	299	283	268	254	242	231	221	212	204	196	182	170
14′-0″	80W	2390	171	157	146	136	128	120	114	108	102	98	93	89	85	82	79	73	68
	100W	2650	189	175	162	152	142	134	126	119	114	108	103	99	95	91	87	81	76
	120W	3520	252	232	216	201	189	178	168	159	151	144	137	131	126	121	116	108	101
	121W	5460	390	360	334	312	292	276	260	246	234	223	213	204	195	187	180	167	156
	141W	5480	391	362	336	313	294	276	261	247	235	224	214	204	196	188	181	168	156
14′-6″	80W	2310	159	147	137	127	120	112	106	100	96	91	87	83	80	77	74	68	64
	100W	2650	183	169	157	146	137	129	122	115	110	104	100	95	91	88	84	78	73
	120W	3390	234	216	200	187	175	165	156	148	140	133	127	122	117	112	108	100	93
	121W	5460	377	348	323	302	282	266	251	238	226	215	206	197	188	181	174	162	151
	141W	5480	378	349	324	302	284	267	252	238	227	216	206	197	189	181	174	162	151
15′-0″	80W	2230	149	137	127	119	111	105	99	94	89	85	81	78	74	71	69	64	59
	100W	2620	175	161	150	140	131	123	117	110	105	100	95	91	87	84	81	75	70
	120W	3280	218	202	187	175	164	154	146	138	131	125	119	114	109	105	101	94	88
	121W	5280	352	325	302	282	264	248	235	222	212	201	192	184	176	169	163	151	141
	141W	5140	342	316	294	274	256	242	228	216	205	195	187	178	171	164	158	147	137

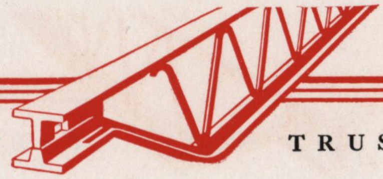


TABLE "A" (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
15′–6″	80W	2160	139	129	119	111	104	98	93	88	84	80	76	73	70	67	64	60	56
	100W	2620	169	156	145	135	127	119	113	107	101	97	92	88	85	81	78	72	68
	120W	3170	204	189	175	164	153	144	136	129	123	117	112	107	102	98	94	88	82
	121W	5200	336	310	288	268	252	237	224	212	201	192	183	175	168	161	155	144	134
	141W	5140	331	306	284	265	249	234	221	209	199	189	181	173	165	159	153	142	133
16′–0″	80W	2090	131	120	112	104	98	92	87	83	78	75	71	68	65	63	60	56	52
	100W	2590	162	149	139	130	121	114	108	102	97	92	88	84	81	78	75	69	65
	120W	3080	192	178	165	154	144	136	128	121	115	110	105	100	96	92	89	83	77
	121W	5030	314	290	270	251	236	222	210	198	189	180	172	164	157	151	145	135	126
	141W	4860	304	281	260	243	228	215	203	192	182	174	166	159	152	146	140	130	122
16′–6″	100W	2510	152	140	130	122	114	107	101	96	91	87	83	79	76	73	70	65	61
	120W	2980	181	167	155	145	136	128	120	114	108	103	99	94	90	87	83	77	72
	121W	4880	296	273	254	237	222	209	197	187	177	169	161	154	148	142	137	127	118
	141W	4860	295	272	253	236	221	208	196	186	177	168	161	154	147	142	136	126	118
17′–0″	100W	2440	143	132	123	115	108	101	96	91	86	82	78	75	72	69	66	62	57
	120W	2900	171	157	146	136	128	120	114	108	102	97	93	89	85	82	79	73	68
	121W	4740	278	257	239	223	209	197	186	176	167	159	152	145	139	134	128	119	111
	141W	4860	286	264	245	229	215	202	191	181	172	163	156	149	143	137	132	123	114
17′–6″	100W	2370	135	125	116	108	102	96	90	86	81	77	74	71	68	65	63	58	54
	120W	2810	161	148	138	128	120	113	107	101	97	92	88	84	80	77	74	69	64
	121W	4600	263	243	225	210	197	186	175	166	158	150	144	137	131	126	121	113	105
	141W	4790	274	252	234	219	205	193	182	173	164	156	149	143	137	131	126	117	109
18′–0″	100W	2300	128	118	109	102	96	90	85	81	77	73	70	67	64	61	59	55	51
	120W	2740	152	140	130	122	114	108	101	96	91	87	83	79	76	73	70	65	61
	121W	4480	249	230	213	199	187	176	166	157	149	142	136	130	124	119	115	107	100
	141W	4790	266	246	228	212	199	188	177	168	159	152	145	139	133	128	123	114	106
18′–6″	100W	2240	121	112	104	97	91	85	81	76	73	69	66	63	61	58	56	52	48
	120W	2660	144	133	123	115	108	102	96	91	86	82	78	75	72	69	66	62	58
	121W	4350	235	217	202	188	176	166	157	148	141	134	128	123	118	113	109	101	94
	141W	4790	259	239	222	207	194	183	173	163	155	148	141	135	129	124	119	111	103
19′–0″	100W	2180	115	106	98	92	86	81	77	72	69	66	63	60	57	55	53	49	46
	120W	2590	136	126	117	109	102	96	91	86	82	78	74	71	68	65	63	58	54
	121W	4240	223	206	191	178	167	157	149	141	134	127	122	116	111	107	103	95	89
	141W	4720	248	230	213	199	186	175	166	157	149	142	136	130	124	119	115	106	100
19′–6″	100W	2120	109	100	93	87	81	77	72	69	65	62	59	57	54	52	50	47	43
	120W	2520	129	119	111	103	97	91	86	82	78	74	70	67	65	62	60	55	52
	121W	4130	212	195	181	169	159	149	141	134	127	121	115	110	106	102	98	91	85
	141W	4700	241	222	207	193	181	170	161	152	145	138	132	126	121	116	111	103	97
20′–0″	100W	2070	104	96	89	83	78	73	69	65	62	59	56	54	52	50	48	44	41
	120W	2460	123	114	105	98	92	87	82	78	74	70	67	64	61	59	57	53	49
	121W	4030	202	186	173	161	151	142	134	127	121	115	110	105	101	97	93	86	81
	141W	4560	228	210	195	182	171	161	152	144	137	130	124	119	114	109	105	98	91
20′–6″	120W	2400	117	108	100	94	88	83	78	74	70	67	64	61	59	56	54	50	47
	121W	3930	192	177	164	153	144	135	128	121	115	109	105	100	96	92	89	82	77
	141W	4450	217	200	186	174	163	153	145	137	130	124	118	113	109	104	100	93	87
21′–0″	120W	2340	111	103	96	89	84	79	74	70	67	64	61	58	56	53	51	48	45
	121W	3830	182	168	156	146	137	129	122	115	109	104	100	95	91	88	84	78	73
	141W	4350	207	191	177	166	155	146	138	131	124	118	113	108	103	99	96	89	83
21′–6″	120W	2290	107	98	91	85	80	75	71	67	64	61	58	56	53	51	49	46	43
	121W	3750	174	161	149	140	131	123	116	110	105	100	95	91	87	84	81	75	70
	141W	4250	198	183	170	158	148	140	132	125	119	113	108	103	99	95	91	85	79
22′–0″	120W	2240	102	94	87	81	76	72	68	64	61	58	55	53	51	49	47	44	41
	121W	3660	167	154	143	133	125	118	111	105	100	95	91	87	83	80	77	71	67
	141W	4150	189	174	162	151	141	133	126	119	113	108	103	98	94	91	87	81	75

TABLE "A" (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings																
			12″	13″	14″	15″	16″	17″	18″	19″	20″	21″	22″	23″	24″	25″	26″	28″	30″
22′-6″	120W	2180	97	89	83	77	73	68	65	61	58	55	53	51	48	46	45	42	39
	121W	3580	159	147	136	127	119	112	106	100	95	91	87	83	80	76	73	68	64
	141W	4060	181	167	155	145	135	127	120	114	108	103	98	94	90	87	83	77	72
23′-0″	120W	2140	93	86	80	74	70	66	62	59	56	53	51	49	47	45	43	40	37
	121W	3500	152	140	130	122	114	107	101	96	91	87	83	79	76	73	70	65	61
	141W	3970	173	160	148	138	129	122	115	109	104	99	94	90	86	83	80	74	69
23′-6″	120W	2090	89	82	76	71	67	63	59	56	53	51	48	46	44	43	41	38	36
	121W	3430	146	135	125	117	109	103	97	92	88	83	80	76	73	70	67	63	58
	141W	3880	165	152	142	132	124	117	110	104	99	94	90	86	83	79	76	71	66
24′-0″	120W	2050	85	79	73	68	64	60	57	54	51	49	47	45	43	41	39	37	34
	121W	3360	140	129	120	112	105	99	93	88	84	80	76	73	70	67	65	60	56
	141W	3810	159	146	136	127	119	112	106	100	95	91	87	83	79	76	73	68	63
24′-6″	141W	3730	152	141	131	122	114	108	102	96	91	87	83	79	76	73	70	65	61
25′-0″	141W	3650	146	135	125	117	110	103	97	92	88	83	80	76	73	70	67	63	58
25′-6″	141W	3580	140	129	120	112	105	99	93	88	84	80	76	73	70	67	65	60	56
26′-0″	141W	3510	135	125	116	108	101	95	90	85	81	77	74	70	67	65	62	58	54
26′-6″	141W	3450	130	120	112	104	98	92	87	82	78	74	71	68	65	62	60	56	52
27′-0″	141W	3380	125	115	107	100	94	88	84	79	75	72	68	65	63	60	58	54	50
27′-6″	141W	3320	121	111	103	97	91	85	81	76	72	69	66	63	60	58	56	52	48
28′-0″	141W	3260	116	107	100	93	87	82	78	73	70	66	63	61	58	56	54	50	47

Open Truss Nailer Joists as Purlins

In addition to their general utility as floor joists, Truscon "O-T" Open Truss Nailer Joists have proved exceptionally efficient and economical when used as roof purlins to support wood deck roofs.

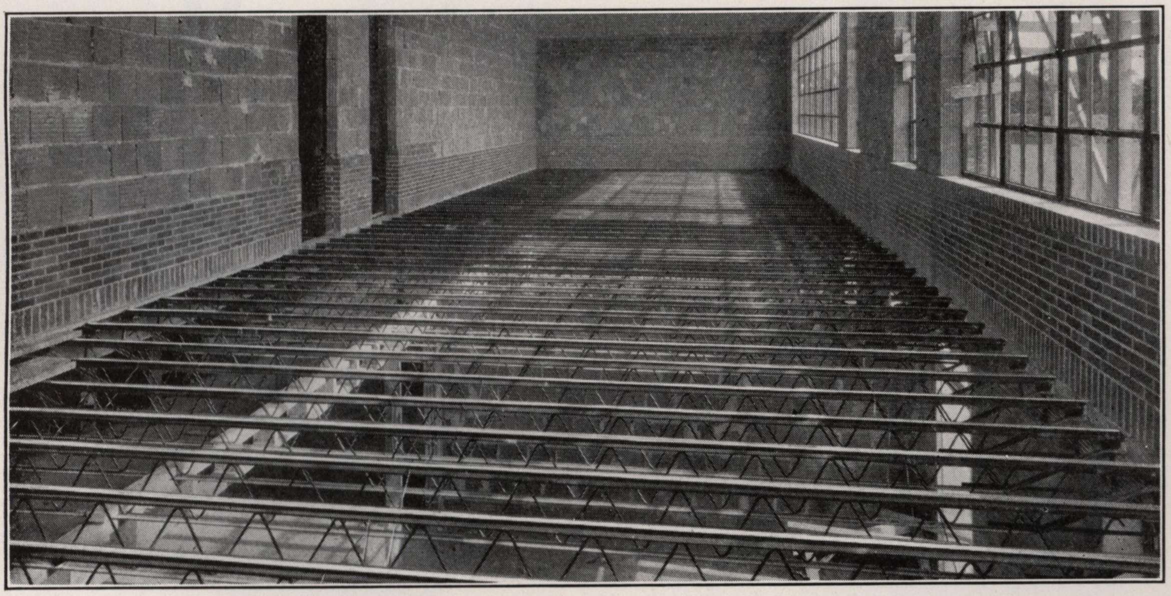
The following tables give the TOTAL safe uniformly distributed load carrying capacities of Truscon "O-T" Open Truss Nailer Joists at various spacings when used as purlins. The weight of DEAD loads must in all cases be deducted to determine the LIVE load carrying capacities of the joists.

TABLE "B"

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings								
			3′-0″	3′-6″	4′-0″	4′-6″	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″
14′-0″	80W	2390	57	49	43	38	34	31	29	26	24
	100W	2650	63	54	47	42	38	34	32	29	27
	120W	3520	84	72	63	56	50	46	42	39	36
	121W	5460	130	111	98	87	78	71	65	60	56
	141W	5480	131	112	98	87	78	71	65	60	56
15′-0″	80W	2230	50	42	37	33	30	27	25	23	21
	100W	2620	58	50	44	39	35	32	29	27	25
	120W	3280	73	62	55	49	44	40	36	34	31
	121W	5280	117	101	88	78	70	64	59	54	50
	141W	5140	114	98	86	76	68	62	57	53	49
16′-0″	80W	2090	44	37	33	29	26	24	22	20	19
	100W	2590	54	46	41	36	32	29	27	25	23
	120W	3080	64	55	48	43	38	35	32	30	28
	121W	5030	105	90	79	70	63	57	52	48	45
	141W	4860	101	87	76	68	61	55	51	47	43
17′-0″	100W	2440	48	41	36	32	29	26	24	22	21
	120W	2900	57	49	43	38	34	31	28	26	24
	121W	4740	93	80	70	62	56	51	46	43	40
	141W	4860	95	82	72	64	57	52	48	44	41

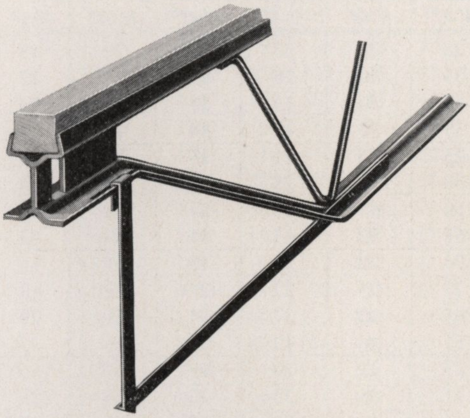
TABLE "B" (*Continued*)

Clear Span	Joist Type	Total Safe Load Pounds	Total Safe Loads in Pounds Per Square Foot for Various Joist Spacings								
			3′-0″	3′-6″	4′-0″	4′-6″	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″
18′-0″	100W	2300	43	36	32	28	26	23	21	20	18
	120W	2740	51	43	38	34	30	28	25	23	22
	121W	4480	83	71	62	55	50	45	41	38	36
	141W	4790	89	76	66	59	53	48	44	41	38
19′-0″	100W	2180	38	33	29	25	23	21	19	18	16
	120W	2590	45	39	34	30	27	25	23	21	20
	121W	4240	74	64	56	50	45	41	37	34	32
	141W	4720	83	71	62	55	50	45	41	38	35
20′-0″	100W	2070	36	31	27	24	22	20	18	17	16
	120W	2460	41	35	31	27	25	22	21	19	18
	121W	4030	67	58	50	45	40	37	34	31	29
	141W	4560	76	65	57	51	46	42	38	35	33
21′-0″	120W	2340	37	32	28	25	22	20	19	17	16
	121W	3830	61	52	46	41	36	33	30	28	26
	141W	4350	69	59	52	46	41	38	35	32	30
22′-0″	120W	2240	34	29	25	23	20	19	17	16	15
	121W	3660	56	48	42	37	33	30	28	26	24
	141W	4150	63	54	47	42	38	34	32	29	27
23′-0″	120W	2140	31	27	23	21	19	17	16	14	13
	121W	3500	51	43	38	34	30	28	25	23	22
	141W	3970	58	49	43	38	35	31	29	27	25
24′-0″	120W	2050	28	24	21	19	17	16	14	13	12
	121W	3360	47	40	35	31	28	25	23	22	20
	141W	3810	53	45	40	35	32	29	26	24	23
25′-0″	141W	3650	49	42	36	32	29	27	24	22	21
26′-0″	141W	3510	45	39	34	30	27	25	23	21	19
27′-0″	141W	3380	42	36	31	28	25	23	21	19	18
28′-0″	141W	3260	39	33	29	26	23	21	19	18	17

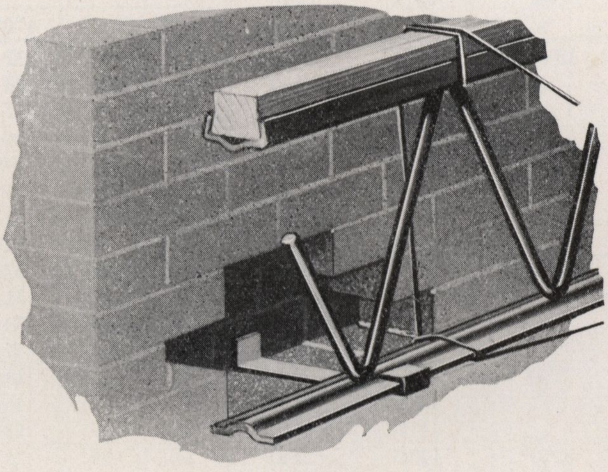


Truscon "O-T" Open Truss Nailer Joist Floor Construction.

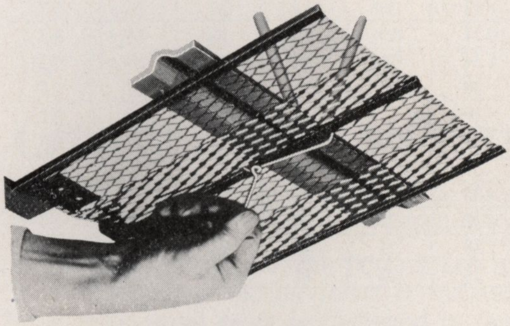
Nailer Joist Accessories



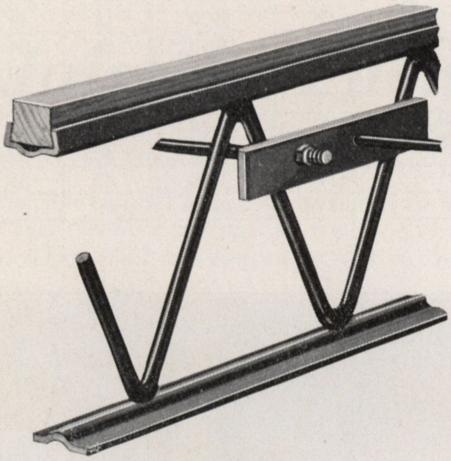
BOTTOM CHORD EXTENSION
(described on page 23)



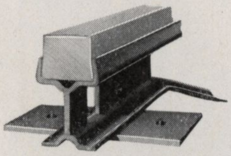
WALL ANCHOR No. 2
(described on page 19)



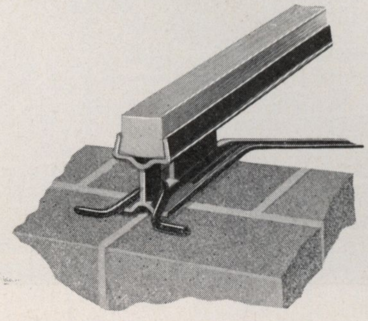
LATH CLIPS
(described on page 18)



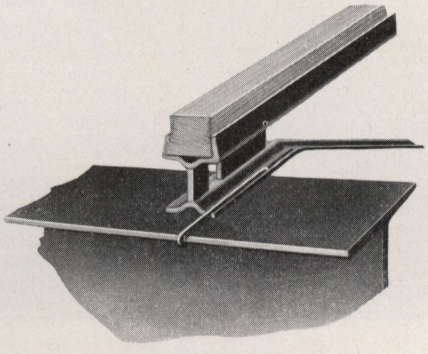
SAG RODS
(described on page 22)



BEARING PLATE
(described on page 22)

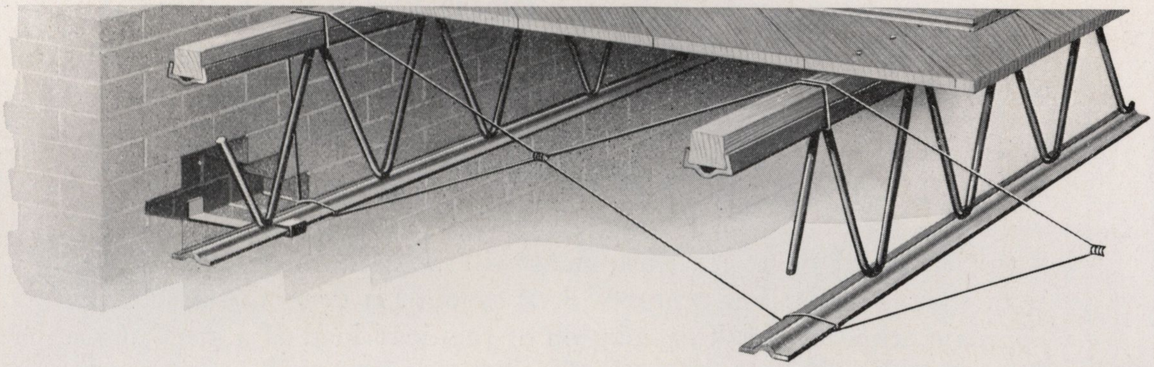


WALL ANCHOR No. 5
(described on page 19)



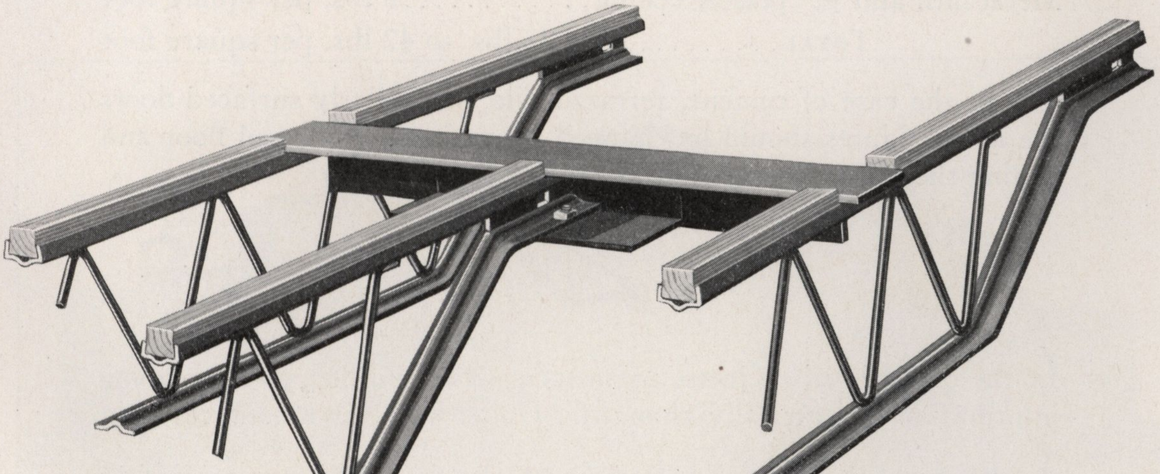
BEAM ANCHOR No. 3
(described on page 19)

Nailer Joist Construction Details



Bridging

No. 14 gauge wire is wrapped around each chord and crossed diagonally between joists, being twisted for tensions. Wall anchors, if specified, can be used to connect the joists to masonry, thus making a rigid anchorage for the bridging. The rough floor, when nailed to the joists, positively spaces the joists and serves as a continuous lateral strut.



Framing Around Small Openings

When it is necessary to frame around small openings such as required for dumb waiters, this framing can be very readily done in "O-T" Open Truss Nailer Joist construction by the introduction of a head angle to support the tail joist. The wood nailer strip, in these cases, must be notched in the field. We recommend that large openings be framed entirely with structural steel.

Calculation of Dead Loads

In the use of any of the loading tables given in this handbook it is necessary to deduct the estimated DEAD load from the TOTAL safe loads listed in order to arrive at the LIVE load carrying capacities of the different joists.

* * *

The dead load of a steel joist floor will be found to be far less than that of any other fireproof floor system. A generally accepted approximation for quick calculation of the dead load of a steel joist floor system is 40 lbs. per sq. ft. This figure will vary, however, and for greater accuracy the following unit weights should be applied to the different materials involved.

Steel joists	from 3 lbs. to 5 lbs. per square foot
Metal lath and 2″ concrete slab	24 lbs. per square foot
1″ wood floor	from 3 lbs. to 5 lbs. per square foot
Metal lath and ¾″ plaster ceiling	8 lbs. per square foot
TOTAL	38 lbs. to 42 lbs. per square foot

In the case of cement, terrazzo, tile, or similarly surfaced floors the above figures should be changed by omitting the wood floor and adding the weight of the finish that is to be used.

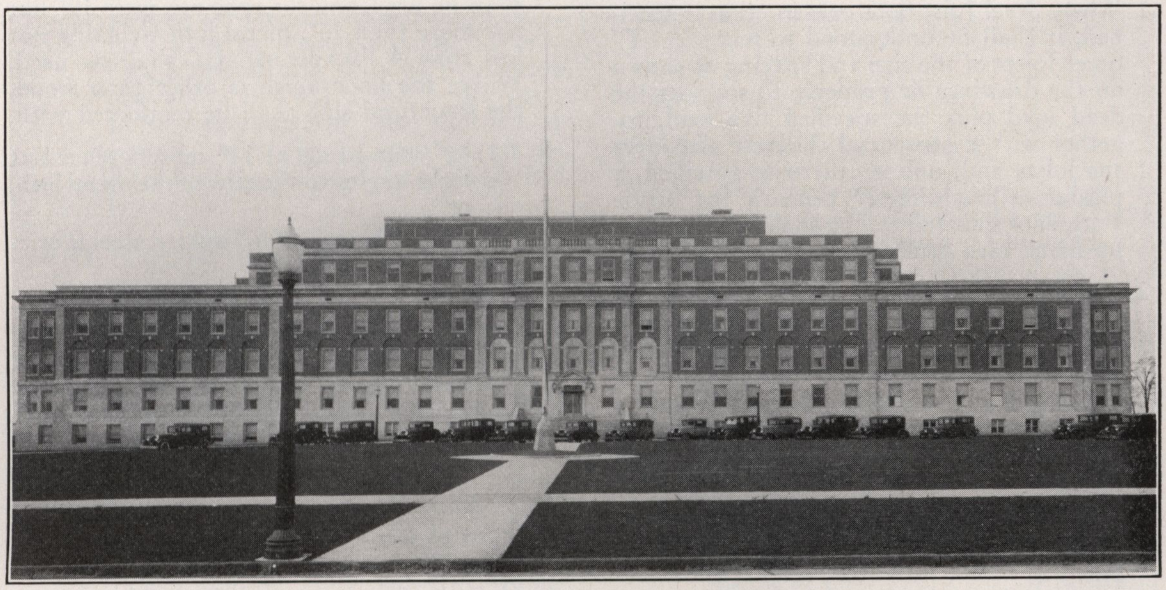
* * *

In the case of Nailer Joists or joists used as purlins, the foregoing information is materially changed. Under such circumstances:—

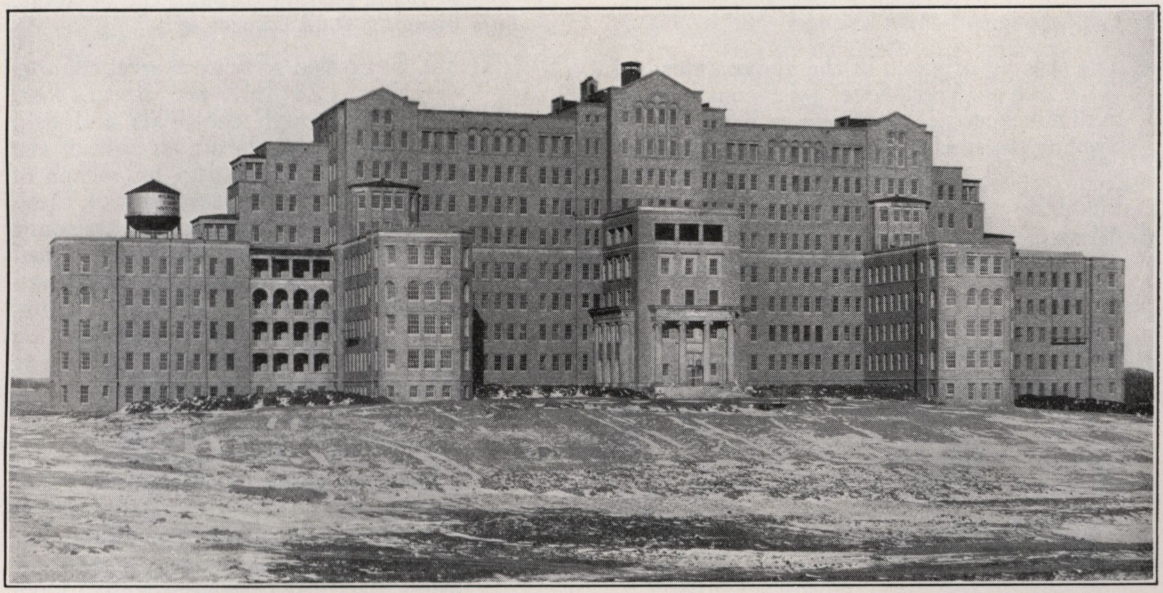
Steel Joists weigh	from 1½ lbs. to 3 lbs. per square foot
Steeldeck	from 2½ lbs. to 3¼ lbs. per square foot
Insulation (½″ thick)	½ lb. per square foot
Waterproofing	from 1 lb. to 2 lbs. per square foot

* * *

Hospitals with Fireproof Steel Joist Floor Construction



THE YOUNGSTOWN HOSPITAL, YOUNGSTOWN, OHIO
Albert Kahn, Inc., Architect
J. Buchheit & Sons Company, Contractors



MILWAUKEE COUNTY HOSPITAL, MILWAUKEE, WISCONSIN
Van Ryn & De Gelleke, Architects
Theodore Stark & Co., Contractors

SPECIFICATIONS
"O-T" Open Truss Steel Joists

General

1 Where Steel Joist floor construction is specified, it shall be understood to mean "O-T" Steel Joists of the size and spacing as shown on the drawings or properly to support the dead load plus the specified live load, together with a structural concrete slab over the joists and, unless otherwise specified, a plaster ceiling directly beneath the joists. Both floor slab and ceiling shall be supported by metal lath firmly attached to the joists.

2 The steel joists shall be made of hot-rolled steel shapes, electrically welded together in such a manner as to form a Warren Truss. The web member of any joist shall be a continuous plain round bar of one diameter throughout its entire length, bent cold. The top and bottom chord members shall be Tee shaped sections. The top chord shall be straight and the bottom chord shall be bent up at the ends to form the bearings.

Design

3 The "O-T" Open Truss Steel Joists shall be of a Warren Truss design and all members shall be of sufficient size to meet the requirements of the Steel Joist Institute specifications and loading tables.

Spacing

4 The spacing of joists in the above described "O-T" Open Truss Steel Joist construction shall not exceed 24″ for floors or 30″ for roofs. Spacing for steel decks up to 7 feet.

Painting

5 All steel joists shall be spray painted with one shop coat of good metal protective paint.

Slab Reinforcement

6 The top concrete slab shall be reinforced and supported by metal lath with 3/8″ ribs not more than 4.8″ apart, the lath to be placed with the ribs up and at right angles to the joists. Sheets shall lap at least 2″ at the ends where the laps occur over the joists and 4″ where the laps occur between the joists, and the ends of both sheets shall be wired together at the lap.

7 The lath shall be attached firmly to the top chords of the joists by means of special wire lath clips spaced not further apart than 12″. For joist spacings up to 19″, metal lath weighing not less than 3.4 lbs. per sq. yd shall be used, and for spacings over 19″ but not more than 24″, metal lath weighing not less than 4 lbs. per sq. yd. shall be used. Where the floor finish is other than wood, the structural slab shall be reinforced with,

8 *(1) 1/4″ round rods at 18″ centers placed at right angles to the ribs of the metal lath, or

*(2) a No. 10 gauge 6″x6″ welded steel fabric.

Bridging

9 As soon as joists have been erected, bridging shall be installed between them before the application of construction loads, and the number of lines of bridging provided shall be in accordance with the following table:

Span	*Number of Lines of Bridging*
up to 14 feet	one row, near center
14 to 21 feet	two rows
21 to 32 feet	three rows

10 This bridging shall be adequate to support safely the top chords against lateral movement during the construction period and shall hold the joists in an approximately vertical plane passing through the bearings. This bridging shall consist of:

*(A) A 2″ hot rolled structural steel channel weighing 1.78 lbs. per linear foot, threaded through the joists and held securely against the under side of the top chords of the joists by means of 5/16″ U-bolts. The outer ends of these channels shall be imbedded in masonry or butted against structural steel members and where spliced, they shall overlap to the extent of 2 joists. Fourteen (14) gauge wire diagonals shall be used to secure the bottom chords at each line of this channel bridging.

*(B) No. 14 gauge wire wrapped around the top chord of one joist and then around the bottom chord of the next and continuing until the top and bottom chords of all joists have been so wired. The wires shall be drawn tight by twisting where they cross between joists. Each end of each line of bridging wire shall be anchored securely to masonry or structural members by means of wall anchors.

SPECIFICATIONS—"O-T" Open Truss Steel Joists (*Continued*)

*(C) $\frac{3}{16}$″ round diagonal tension members supplemented by a continuous ½″ round deformed steel bar placed on top of and transversely to the joists to act as a strut. The diagonal tension members shall be wound around the bottom chords of all joists and extended diagonally upward through the open web of the adjacent joist and wound tightly around the ½″ strut bar on the far side of the top chord of the adjacent joist.

*(D) Diagonal members made from ¾″ channels, capable of resisting both tension and compression, with positive provision at the end of each run of bridging to hold the first two joists in a vertical plane. These diagonal members shall be integrally attached to the top and bottom chords of all joists.

Ceilings

11 Where plastered ceilings are to be attached directly to the joists, metal lath conforming to the following weights for various spacings shall be attached with the ribs up and at right angles to the joists by means of lath clips spaced not more than 8″ on centers. The ends of the sheets to be lapped 2″ where the lap occurs at the joists and 4″ where the lap occurs between the joists; the ends of sheets to be securely wired together. For joist spacings up to 19″, use flat rib lath weighing not less than 3.2 lbs. per sq. yd. or ⅜″ rib lath weighing 3 lbs. per sq. yd. For joist spacings over 19″ but not more than 24″, use ⅜″ rib lath weighing 3.4 lbs. per sq. yd. For joist spacings between 24″ and 30″, use ⅜″ rib lath weighing 4 lbs. per sq. yd.

Bearing

12 Joists shall have a minimum bearing of 4″ on concrete or masonry and 2½″ on steel.

Floor Slabs

13 When the floor finish is cement, tile, or similar materials the structural slab shall be continuous and not less than 2″ in thickness of 1:2:4 stone concrete.

This concrete shall be what is known as a dry mix and, if buggies or barrows are used for distribution, planks shall be placed across the top of the joists for runways and the concrete shall not be dumped between the joists but shall be dumped over the top of a joist so as to prevent unnecessary sagging of the metal lath.

Wood Floors

14 Where wood floors are specified,

*(A) 2″x2″ beveled wood screeds shall be laid on top of the metal lath, parallel to and directly over the joists and attached to the top chords of the joists by means of screed clips spaced not more than 16″ on centers and staggered on either side of screeds. The space between the screeds shall be filled with concrete as specified under floor slabs.

*(B) 2″x1″ beveled wood screeds shall be placed parallel to and directly over the joists. These shall be elevated 1″ above the joists and securely held in place by means of screed clips spaced 16″ apart which in turn shall be rigidly attached to the steel joists. The space between and beneath the screeds shall be carefully filled with concrete as specified under "Floor Slab."

*(C) 2″x1″ beveled wood screeds spaced (16″) apart shall be placed above and at right angles to the joists. These shall be elevated 1″ above the joists and securely held in place by means of screed clips which in turn shall be rigidly attached to the steel joists. The space between and beneath the screeds shall be carefully filled with concrete as specified under "Floor Slab."

15 Where single wood floors are specified the joist spacings shall not exceed 20″ except where the wood screeds are laid at right angles to the joists.

Plaster Ceilings

16 Plaster ceilings shall be not less than ¾″ in thickness and shall be of cement, hard wall or gypsum plaster.

NOTE:—In all cases where an asterisk (*) is shown, the specification writer should select the paragraph to suit his requirements.

SPECIFICATIONS—"O-T" Nailer Joists

GENERAL

1 Where Nailer Joist floor construction is specified, it is understood to mean "O-T" Nailer Joists of the size and spacing as shown on the drawings or properly to support the dead load plus the specified live load, together with a wooden floor over the joists and, unless otherwise specified, a metal lath and plaster ceiling directly beneath the joists.

2 The Nailer Joists shall be made of steel shapes, electrically welded together in such a manner as to form a Warren Truss. The web member of any joist shall be made of a continuous plain round bar of one diameter throughout its entire length, bent cold. The top chords shall be straight and the bottom chords shall be bent up at the ends to form the bearings. The wood nailing strip shall be held securely on top of the top chord by pressure imbedment of the flanges of the top chord into the sides of the wood nailer strip.

DESIGN

3 The "O-T" Open Truss Nailer Joists shall be of a Warren Truss design and all steel members shall be of sufficient size to meet the requirements of the Steel Joist Institute Specifications. The wood nailer strip shall not be considered in determining the carrying capacity of the joists.

SPACING

4 The spacing of the Nailer Joists shall not be greater than the safe span of the flooring over the joists.

PAINTING

5 All Nailer Joists shall be spray painted with one shop coat of good metal protective paint.

BRIDGING

6 As soon as joists have been erected, bridging shall be installed between them before the application of construction loads and the number of lines of bridging provided shall be in accordance with the following table:

Span	*Number of Lines of Bridging*
Up to 14 feet	one row, near center
14 to 21 feet	two rows
over 21 feet	three rows

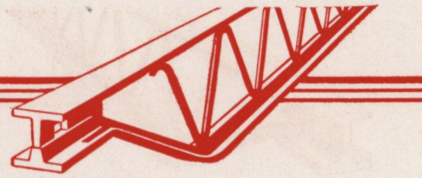
7 This bridging shall consist of No. 14 gauge wire wrapped around the top chord of one joist and then around the bottom chord of the next and continuing until the top and bottom chords of all joists have been so wired. The wires shall be drawn tight by twisting where they cross between joists. Each end of each line of bridging wire shall be anchored securely to masonry or structural members by means of wall anchors. The wood deck may be considered as the top member of the bridging system.

CEILINGS

8 Where plastered ceilings are to be attached directly to the joists, metal lath conforming to the following weights for various spacings shall be attached with the ribs up and at right angles to the joists by means of lath clips spaced not more than 8″ on centers. The ends of the sheets to be lapped 2″ where the lap occurs at the joists and 4″ where the lap occurs between the joists; the ends of sheets to be securely wired together. For joist spacings up to 19″, flat rib lath weighing not less than 3.2 lbs. per sq. yd. or 3/8″ rib lath weighing 3 lbs. per sq. yd. shall be used. For joist spacings over 19″ and not more than 24″, 3/8″ rib lath weighing 3.4 lbs. per sq. yd. shall be used. For joist spacings between 24″ and 30″, 3/8″ rib lath weighing 4 lbs. per sq. yd. shall be used.

BEARING

9 Joists shall have a minimum bearing of 4″ on concrete or masonry and 2½″ on steel.



STANDARD SPECIFICATIONS for Steel Joists

Compiled by Frank Burton, Consulting Engineer. Adopted by the Steel Joist Institute, December 20, 1928. Effective February 1, 1929

Definition

1 Any steel beam or truss shaped steel member suitable for supporting floors and roofs when used for floor filling between the main supporting girders, beams or walls, shall be known as a steel joist. Such joists may be made of rolled shapes or strips of sheet steel, round bars, angles or specially rolled bars riveted or welded together, or by expanding rolled shapes, or by any other method complying with the requirements of this article.

Materials

2 All steel used shall conform to the standards of the American Society for Testing Materials for structural steel for buildings designated as A9-24.

All joists shall receive one coat of good paint by dipping or spraying before leaving the shop.

Connections

3 The joints and connections of all steel joists shall be made by connecting the members directly to one another by electric-arc, spot or pressure welds or by rivets. In the case of expanded joists, a portion of the metal may be left intact to form a connection. All joints and connections shall be capable of withstanding a stress at least three (3) times the designed stress and shall be sufficiently rugged to resist the stresses incident to handling and erection when handled in a reasonable manner. All intermediate joints shall be designed so as to be as symmetrical as possible and in no case shall the eccentricity of any such joint exceed three-quarters (¾) of the least diameter of the largest bar connected, but end members may be designed as projecting beams. Stresses arising from eccentricity shall be included with other stresses in designing all members.

NOTE:—Experience shows that the stress arising from careless handling is much greater than that sustained by the connection while working at full load.

Methods of Design and Stresses

4 (A) Steel joists having solid webs shall be designed as beams. The maximum fibre stress in tension and compression shall not exceed eighteen thousand (18,000) pounds per square inch. The maximum distance from any part of the compression flange to the web shall not exceed thirty (30) times the thickness of the flange metal. The web shear shall not exceed that allowed in the Standard Specifications of the American Institute of Steel Construction published December, 1927. Webs made of two or more sheets of metal shall be considered as separate members, each carrying its share of the shear.

(B) Steel joists built up of bars or other sections and those fabricated by expanding rolled sections shall be designed as trusses. The compression stresses in pounds per square inch in the top chords or diagonals shall not exceed

$$15{,}000 \text{ nor } \frac{18{,}000}{1 + \dfrac{l^2}{18{,}000r^2}} \text{ when the}$$

length, l, of the member is taken as the distance clear of welds or other attachments, and r is the least radius of gyration in the case of diagonal and vertical members and the radius of gyration around the horizontal axis in the case of top chords which shall be considered as stayed laterally by the slab above. The ratio of l to r shall not exceed 120. In computing the resistance of joists to construction loads as required in Section 7, the top chord shall satisfy the additional requirements that it shall safely carry the required compression using l as the distance between lines of bridging and r as the least radius of gyration around the vertical axis but the ratio of l to r in this case may be not exceeding 200. No bending stresses shall

STANDARD SPECIFICATIONS for Steel Joists (*Continued*)

be assumed in top chords of trusses supporting concrete slabs which have a thickness of more than one-fourteenth (1/14) of the distance between vertical supports under the top chord, but for joists supporting concrete slabs thinner than this and joists supporting wood floors, the theoretical bending stress for a uniform load shall be computed and subtracted from the allowable stress at the center of the panel. Combined axial compression and bending stress at points of vertical support of the top chord shall not exceed eighteen thousand (18,000) pounds per square inch. The unit tensile stress shall not exceed eighteen thousand (18,000) pounds in any member.

NOTE:—This paragraph does not require that bending stress shall be figured if a concrete slab two (2) or more inches thick is used with wood sleepers embedded as described in section 9, paragraphs B and C of this specification, nor does it require bending stresses to be figured when a wood sleeper parallel to the joist and resting on top of the joist is of sufficient size to satisfactorily carry the loads from panel point to panel point.

Span

5 The span of joists having an all steel top chord shall not exceed five hundred and fifty (550) times the radius of gyration of the top chord in a plane perpendicular to the web of the joist, but in case the top chord consists of a flat top section continuous with a center web, the radius of gyration of the top plate alone shall be taken. In the case of joists having a top chord of steel with a wood nailing strip attached, the span shall not exceed one hundred sixty (160) times the total width of the top chord. The span shall not exceed twenty-four (24) times the depth of the steel portion of the joist for open web joists, but solid web joists may exceed this ratio if the fibre stress is reduced to maintain a deflection of not to exceed one three hundred and sixtieth (1/360) of the span for the live load.

Spacing

6 The spacing of the joists shall not be greater than the safe span of the top slab or flooring over the joists, and in no case shall be greater than twenty-four (24″) inches in floors and thirty (30″) inches in roofs, except that steel joists may be used to support wood or sheet metal roofs only if not over seven (7) feet apart.

Erection

7 Joists shall have a bearing of at least four (4″) inches on masonry or reinforced concrete, and at least two and one-half (2½″) inches on steel. The unit bearing pressure on masonry and concrete shall not exceed two hundred (200) pounds per square inch, and on steel shall not exceed one thousand (1,000) pounds per square inch. Every third joist shall be anchored to concrete or masonry support with an anchor equivalent to a one-quarter (¼″) inch round. All joists supported on steel beams shall be secured with a hook made of not less than one-quarter (¼″) inch bar fastened over the flange of the beam, except in the case of buildings having a height of more than twice the least dimension of the base, in which case each joist shall be welded to the steel work with two (2) welds at each end, each one (1″) inch long or by means of a one-half (½″) inch bolt or rivet at each end.

All joists shall be fastened in place and permanent bridging installed before any construction loads, except the weight of the necessary workmen to install bridging, is placed upon the joists.

The joists when erected and bridged shall be capable of safely sustaining a load of eight hundred (800) pounds at any panel point on any one joist.

NOTE:—In all framed structures, the frame should be designed to carry all wind load without assistance from the floor construction. In the case, however, of relatively high slender buildings, it is provided that the joists shall be welded to supports to give stiffness. In the case of relatively low buildings, this is not necessary and it is provided only that the joists shall be hooked over supports to guard against accidental dislodgment during erection. In the case of fires, the greatest part of the damage is due to the expansion of structural members. In the case of steel joists, expansion across the run of joists is of course impossible, and by leaving the ends free, expansion in the direction of the joists will be rendered harmless.

Before being bridged, steel joists cannot be expected to sustain considerable loads, especially moving loads common in building construction. Loading of unstayed joists may easily result in construction accidents.

STANDARD SPECIFICATIONS for Steel Joists (*Continued*)

Bridging

8 As soon as joists have been erected, bridging shall be installed between them before the application of construction loads. The bridging shall be adequate to safely support the top chord against lateral movement during the construction period and shall hold the joists in an approximately vertical plane passing through the bearings. If diagonal bridging is used in which all diagonal members will resist only tension, they shall not be less in area than a three-sixteenth (3/16″) inch round rod and these diagonals shall be supplemented by a continuous strut between the top chords of all joists so bridged. This top strut shall be equivalent as a strut to a half-inch round steel bar. If diagonal members are used which are capable of resisting both tension and compression, the top strut may be omitted, but positive provision must be made at the end of each run of bridging to hold the first two joists in a vertical plane. These diagonal struts shall be capable of transferring five hundred (500) pounds from each joist to the adjoining joists. In case bridging in the form of horizontally placed beam or angle sections is provided, it must be adequate to transfer not less than five hundred (500) pounds from each joist to the adjoining joists without appreciable deflection, and it must also be so connected to the joists that it will support the top chords against lateral movement and hold the joists approximately in a vertical plane. Fourteen (14) gauge wire diagonals shall be used to secure the bottom chord at each line of bridging of this type. Wire may be omitted when a portal bridging is used which restrains both top and bottom chords and transmits the load required herein. The number of lines of bridging provided shall be in accordance with the following table:

Span	*Number of Lines of Bridging*
Up to 14 feet	one row, near center
14 to 21 feet	two rows
21 to 32 feet	three rows

In the case of joists provided with nailer strips carrying a wood deck, the wood deck may be used as the top member of the bridging system.

Uses of Steel Joists

9 (A) When used in any construction where wood joists are permitted, steel joists may have a wood nailing strip attached to the top chord and a wood floor may be used over such joists.

(B) One hour fire resistance. Steel joists with or without a wood nailing strip above, when protected with a ceiling of metal lath and plaster three-quarters (¾″) inch thick, may be used wherever a one hour fire resistance is required. A wood top floor may be used in such cases.

(C) Two hour fire resistance. Steel joists protected with a ceiling of metal lath and gypsum or portland cement plaster at least three-quarters (¾″) inch thick may be used wherever a two-hour fire resistance is required. Joists for this purpose shall not have any wood nailing strip attached thereto and shall be covered with a top slab of concrete at least two (2″) inches thick cast upon metal lath or other incombustible material. Wood nailing strips may be embedded in this concrete slab if protected on the bottom with not less than one (1″) inch of concrete.

(D) Three hour fire resistance. Steel joists protected with a ceiling of metal lath and gypsum or portland cement plaster at least one (1″) thick may be used wherever a three hour fire resistance is required. Joists for this purpose shall not have any wood attached and shall be covered on top by at least two and one-half (2½″) inches of solid concrete. No wood nailing strips shall be used in such top slab.

(E) Four hour fire resistance. Steel joists protected on the bottom with a poured or precast reinforced gypsum slab not less than two (2″) inches thick and otherwise in accordance with paragraph (D) above may be used wherever a four-hour fire resistance is required.

NOTE:—Tests made by the Beareau of Standards show that ten (10) pounds of wood, paper or other combustible are required for each square foot of floor space to sustain a fire equivalent in intensity to a one hour standard fire test. Similarly, twenty (20) pounds of combustible will produce a two hour fire, thirty (30) pounds a three hour and about thirty-seven (37) pounds a four hour fire.

STANDARD SPECIFICATIONS for Steel Joists (*Continued*)

In order that a structure may safely resist the complete burning of its contents, it is only necessary that all the elements of the construction should safely withstand a fire slightly greater than the maximum that can be supported by its total contents. Usually, a factor of safety of one and one-half (1½) is used based upon the average combustible contents.

The combustible contents of the following occupancies including wood floor finish, trim and doors is ordinarily not greater than ten (10) pounds so that a two hour protection would give a more than ample factor of safety: Dwellings, apartments, hotels, hospitals, schools, colleges, theatres (except stage), churches, assembly halls, lodge halls, offices (except record storage) and manufacturing buildings used for fabricating metal or other incombustible materials. Storage rooms in any of the above occupancies, such as locker rooms in apartments, carpentry shops in hotels and hospitals and record vaults in offices, will often contain considerably more combustible than this and should be protected for a four-hour fire.

Mercantile buildings, factories and warehouses vary considerably in combustible contents and are usually protected for a three or four hour period. No mention is made of the protection to beams and columns which are outside of the province of this standard.

DECKS AND TOP SLABS

10 Decks or top slabs of wood, concrete, gypsum or other materials shall be assumed to stay the top chords of joists laterally but shall not be assumed to carry any part of the compression stress.

Flat wood decks of single thickness of seven-eighths (⅞″) inch material shall not have a span of more than twenty (20″) inches for floors, or thirty (30″) inches for roofs, and those made with one and five-eighths (1⅝″) inch material shall not have a span of more than five (5′) feet in any case. All such decks shall be securely fastened to the wood nailer strips.

Poured structural slabs of concrete, gypsum or other material shall not be less than two (2″) inches thick. They shall be poured upon three-eighths (⅜″) inch ribbed metal lath weighing not less than four (4) pounds per yard, or other incombustible materials at least equivalent in strength and stiffness. This lath shall be attached by substantial clips or soft wood wedges to the top chord of each joist at intervals of not over eight (8″) inches. When no wooden top floor is to be placed over such slabs, they shall be adequately reinforced with mesh or rods in addition to the lath to safely resist both positive and negative bending with due allowance for probable load concentrations.

NOTE:—No material should be used as centering for the top slab which must be stretched across the top chord of joists or which will exert an undue lateral pull on the top chords of the joists during the pouring of concrete.

DEFLECTION

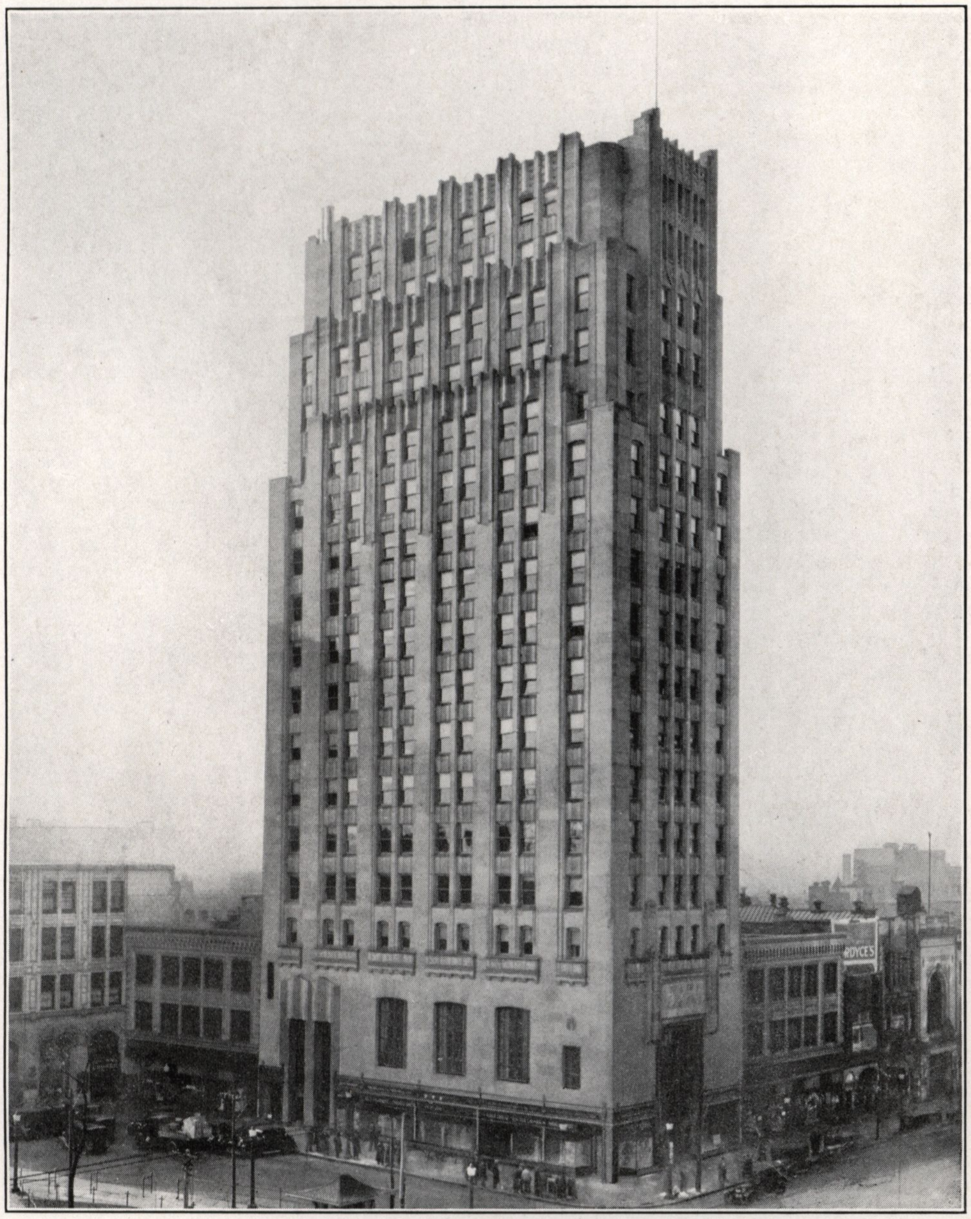
11 The deflection due to the designed live load shall not exceed one three hundred and sixtieth (1/360) of the span. The permanent deflection resulting from loading a finished floor to twice the designed live load for twelve (12) hours shall not exceed twenty (20%) per cent of the total deflection for this load.

FACTOR OF SAFETY

12 The maximum uniform load at failure shall not be less than the dead load plus two and one-quarter (2¼) times the designed live load of joists as computed by using the stresses permitted herein.

NOTE:—In testing steel joists in common with all other materials, it is essential that proper methods be used. Proper tests cannot be performed without the assistance of trained engineers experienced in such matters. In all cases, commercial sized joists should be used, bridged according to the method used in the field and provided with a top slab or deck as nearly as possible like that to be used in actual construction. Slabs made with quick setting portland cement can be tested within twenty-four (24) hours. The load applied should be uniformly distributed so that the joists may be tested both in bending and shear.

A seventeen-story Bank Building with Steel Joist Construction throughout



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